



New Hanover County City of Wilmington

North Carolina



Agency Evaluation Update and Consolidation Feasibility Study

Spring/Summer 2014



Emergency Services
Consulting International

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Executive Summary

Emergency Services Consulting International (ESCI) was engaged by New Hanover County and the City of Wilmington, NC to conduct an update to previous evaluations done on each jurisdiction's fire department and to provide them with feasibility options for future collaborative and cooperative efforts. This report serves as the culmination of those updates and options analyses and begins with a review of each department's populations, demographics, infrastructure and resources, followed by an analysis of service delivery components including demand, distribution, concentration, reliability and response performance.

ESCI has worked with each community several times over the last 15 years providing agency evaluations and cooperative efforts feasibility analysis as follows:

1998 – Cooperative Efforts Feasibility Study (New Hanover County)

2006 – Fire Department Assessment (Wilmington Fire Department)

2009 – Cooperative Efforts Feasibility Study (New Hanover County)

As a result of these studies, in part, each agency has progressed and addressed many of the issues addressed within each individual project. Fire service in New Hanover County has been transformed from a fragmented system where multiple private not-for-profit fire departments worked in concert with New Hanover County Fire Services (NHCFR) to a single provider, county operated system that is fully integrated in providing services to the unincorporated areas of the county. Wilmington Fire Department (WFD) has, through a process of administrative and organizational changes, worked to replace outdated facilities and equipment and improve the overall level of service being provided to the citizens of the City of Wilmington.

The departments in recent years have opened the lines of communications and are now working more cooperatively than ever before. One such example is providing a closest unit response along jurisdictional boundaries so that overall service levels improve to all citizens regardless of where they live. Both departments should be commended for this approach to cooperative efforts while maintaining independence and individual identity. The body of this document serves as a comprehensive review and update of each organization and begins with an evaluation of governance, organizational design, and budget, funding, fees, and taxation.

New Hanover County Fire Rescue (NHCFR) serves the unincorporated areas of New Hanover County as a combination career/volunteer all-hazards emergency services provider. The department serves a population of approximately 88,832 in an area of approximately 138.7 square miles resulting in an overall population density of 669 persons per square mile. Wilmington Fire Department (WFD) serves the City of Wilmington, NC as a fully career all-hazards emergency services provider. The department serves a population of 109,922 in an area of 52.8 square miles resulting in a population density of 2,082 persons per square mile. As the largest city in New Hanover County, the city serves as the hub of commerce, which generates an additional 27,811 in population during daytime hours due to commuter

traffic. In addition, it is assumed that the general population increases dramatically during the summer months.

The primary governance difference between the two organizations is that WFD is a general fund department within the governmental structure of the City of Wilmington while NHCFR (operating as a department within New Hanover County government) is funded by a special fire tax district applied to the unincorporated areas. Although organized in different manners, each department has a clear unity of command and is organized with clear operating divisions with assigned program managers. Each fire chief's span of control is limited through delegation of responsibilities to other chief officers.

The combined budget of the two departments equals \$27,196,640, resulting in a per capita cost of \$136.84 compared to the North Carolina and National averages of \$90.89 and \$135.60 respectively. A majority of each department's budgets is comprised of personnel costs; 60.8 percent for NHCFR and 87.6 percent for WFD, with the remaining budget dedicated to operating expenses and capital.

NHCFR operates from eight strategically located stations distributed throughout the unincorporated area of the county plus an administrative office space in the New Hanover County Government Center that houses, administration, training and fire prevention. WFD operates from 11 stations distributed throughout the City of Wilmington with administrative and support functions collocated within the headquarters station. Although the city owns all of its stations, NHCFR only owns four of its facilities. While the intent of the current study was not to provide an additional in depth review of the facilities it should be noted that since the last visit in 2009 and with the consolidation of the NHCFR system it is of merit to review the current distribution of stations in regards to population density, travel times and potential development. New Hanover County was successful in obtaining use agreements for the existing facilities for service delivery post consolidation; however a review of the physical structures for location, long term sustainability and basic amenities for being considered an efficient facility to provide service from should be included with any recommendations derived from this report.

Each department also operates a fleet of specialized emergency apparatus including engines/pumpers, aerial/ladders, heavy rescues, tanker/tenders, brush/wildland units, and other ancillary vehicles. In total, the system contains 23 engines, two aerial/ladders (plus three quint apparatus that can function either as an engine or an aerial ladder), two rescues, three tanker/tenders, and 37 other vehicles. WFD is in the process of transitioning their quints to 'truck' companies that will be capable of rescue in support of the department's heavy rescue unit located at Station 2. Both departments also maintain formal capital replacement plans that are funded through a variety of methods including general fund budget requests, bonds, or installment financing.

From a staffing perspective, ESCI reviews personnel from two perspectives: Administrative/Support and Operational. The two departments have a combined total of 45 administrative and support personnel (16 within NHCFR and 29 within WFD). Operationally, the departments have a total of 291 uniformed personnel (102 within NHCFR and 189 within WFD). In addition to these career personnel, NHCFR also has a small cadre of part-time paid personnel (37) and 22 volunteers that were retained from the previous volunteer fire departments throughout the area. On a per capita basis, NHCFR's operations

complement calculates to 1.09, compared to the regional and national medians of 1.58 and 1.28 respectively. WFD's per capita operations complement calculates to 1.69, compared to the regional and national medians of 1.43 and 1.34 respectively. The median benchmarks are different for each agency based on the different populations served by each department.

How these personnel are deployed across each department's network of stations varies based on apparatus staffing patterns. WFD is currently in a transition to bring all apparatus staffing to a minimum of four personnel while NHCFR varies staffing levels based on apparatus type. Each station houses an engine as the primary response vehicle but most also house additional apparatus that can be used based on the specific incident type. For example, if the dispatched incident is wildland in nature, brush vehicles or tenders may respond rather than the primary engine. Similarly, if the incident is in a rural area, a tender may respond in addition to the primary apparatus or in place of an aerial ladder. Staffing will vary for these specific apparatus on how many personnel are available and the type of incident dispatched. NHCFR should consider additional staffing to certain stations in which tender are assigned. As indicated earlier in this section, the tenders are cross-staffed with crews that are assigned to rescue or engine companies. In essence, when fires are dispatched in areas lacking fire hydrants, some primary apparatus may be removed from service to ensure that tenders are able to respond in a timely manner. While staffing each tender may not be practical, consideration should be given to staff strategic tender locations.

ESCI also reviewed personnel management components of policies and handbooks, compensation systems and rank structure, disciplinary processes, application and recruitment processes, testing, measurement, and promotional processes, and health and wellness programs. Many of these elements are similar between the organizations and recommendations are made to improvements to these areas where appropriate.

The next section of the report focuses on service delivery and performance of each agency with specific attention given to service demand, distribution, concentration, reliability and response time measurement. In regards to service demand, over the three year period, NHCFR has increased 6.0 percent while WFD increased approximately 9.6 percent. This trend is expected to continue. A majority of both agencies' service demand over the past three years is medical responses. This is common for departments that are active participants within their local emergency medical services system. Service demand was reviewed temporally; by month, by day of week and by hour of day. Although a slight increase in service demand was noticed during the summer months, an almost identical increase was noted during the months of November, December and January. No identifiable trend was present based on the day of week analysis but hour of day displayed an expected increase in service demand between 6:00 a.m. and 7:00 a.m., peaking during the mid-afternoon hours and then declining into the evening.

Service demand was also evaluated geographically to determine where the highest levels of service demand were occurring and to ensure that station/resource distribution is sufficient to respond to the highest level of demand. As expected, the highest density of demand occurs in the core of the City of Wilmington with moderate levels of demand extending to the south of the city. The same is true when evaluating service demand by incident type.

Distribution analysis was completed for each agency to determine the amount of historic service demand could be reached within established response performance objectives and in comparison to industry standards. The analysis indicates that, for NHCFR, only a small area immediately surrounding each station can be reached within four minutes of travel time. A significantly higher percentage of service demand can be reached within 10 and 14-minutes of travel as represented by travel model maps within the body of the report. This indicates that NHCFR should establish response time models based on population zones that include recommended criteria for urban, suburban, and rural density levels. Given the distribution of WFD facilities, a majority of the city can be reached within four minutes of travel.

Concentration is an analysis of the department's ability to assemble an adequate amount of resources, personnel and/or apparatus, within a sufficient amount of time to effectively mitigate specific incidents, particularly structure fires. While NHCFR's effective response force capabilities appear to be limited to the areas just to the north of the City of Wilmington, these are some of the areas of highest population and structure density. For WFD, with the exception of areas in proximity to WFD Stations 8, 9, 10 and 15, the department's deployment is sufficient to meet the modeled apparatus concentration. Given the fact that WFD uses quint apparatus in some stations, the concentration analysis was conducted again considering the aerial capability of those apparatus. Since quints can be used as either an engine or an aerial depending on the location and type of incident combined with whether or not that apparatus is first in on a structure fire, concentration analysis was completed in a different manner, which showed an overall improvement in concentration capability.

The workload on emergency response units can be a factor in response time performance. The busier a given unit, the less available it is for the next emergency. If a response unit is unavailable, then a unit from a more distant station (or mutual aid department) must respond, increasing overall response time. A cushion of surplus response capacity above average values must be maintained due to less frequent but very critical times, when atypical demand patterns appear in the system. Multiple medical calls and multi-casualty events are examples.

One way to evaluate resource workload is to examine the frequency at which multiple calls occur within the same time frame on the same day. ESCI examined the calls during the last full year to find the frequency that each department is handling multiple calls within any time frame. Multiple calls occurring at one time can stretch available resources and extend response times. As in most communities, the majority of calls throughout the NHCFR and WFD primary response (not including mutual aid) areas occur singularly. However, as communities grow and age, the propensity for concurrent calls increases. When call concurrency reaches a level to which it stretches resources to near capacity, response times begin to extend. Although medical calls will cause drawdown as concurrency increases, they usually occupy only one unit at a time. Multi-casualty incidents (such as motor vehicle accidents) may need additional ambulances and create periods of extensive resource drawdown in an area, as is the case with involved fire and/or rescue incidents. Based on the reliability analysis, each department responds to a majority of incidents singularly with a second simultaneous incident occurring 20.6 percent and 28.9

percent for NHCFR and WFD respectively. Given the resources within each organization, the current level of reliability should be of little concern.

When discussing emergency services organizations, the primary issue of question is response performance. Response performance analysis evaluates how quickly an organization responds to an incident and is more commonly known as response time. The response time continuum, the time between when the caller dials 9-1-1 and when assistance arrives, is comprised of several components:

- Processing Time – The amount of time between when a dispatcher answers the 9-1-1 call and resources are dispatched.
- Turnout Time – The amount of time between when units are notified of the incident and when they are en route.
- Travel Time – The amount of time the responding unit actually spends on the road to the incident.
- Response Time – A combination of turnout time and travel time and generally accepted as the most measurable element.

For this analysis, ESCI was most interested in the ability to respond the appropriate resources to the highest percentage of incidents. For this reason, ESCI analyzed National Fire Incident Reporting System (NFIRS) data and generated average, 80th and 90th percentile response performance for emergency incidents only. In addition, while NFIRS data does not require the recording of call pick-up versus dispatch time (producing call processing time) or the en route time (producing turnout time), computer aided dispatch data for the same period was also evaluated to extract this information. Although presented together, the performance of each agency should be viewed individually since each agency adheres to their own independent response performance objectives. The analysis begins with an evaluation of call processing performance as provided below. The average is provided for illustration purposes only.

	NHCFR	WFD
Average	0:02:18	0:01:58
90th Percentile	0:03:44	0:03:31
95th Percentile	0:04:53	0:04:52

Turnout is the time it takes personnel to receive the dispatch information, move to the appropriate apparatus and proceed to the incident. *NFPA 1710* provides for two different turnout time performance objectives in this regard; 60 seconds for medical responses and 80 seconds for fire responses; allowing personnel additional time to don personal protective equipment; both measured at the 90th percentile. The following figure summarizes turnout time performance for both study agencies.

	NHCFR	WFD
Average	0:01:17	0:01:06
80th Percentile	0:01:40	0:01:26
90th Percentile	0:02:03	0:01:48

When measured at the 90th percentile, the departments fall outside the published performance objective. Although the established objectives are relatively aggressive, both departments are performing at a level comparable to other agencies ESCI has worked with. The next performance objective is that of travel time.

	NHCFR	WFD
Average	0:04:30	0:03:17
80th Percentile	0:05:55	0:04:07
90th Percentile	0:07:09	0:05:17

NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments includes a performance objective of 240 seconds or less travel time for the arrival of the first arriving engine company in urban areas serviced by career fire departments. Based on the CAD data provided, WFD is just over a minute longer in travel time than recommended by *NFPA 1710*.

NFPA 1720 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer or Combination Fire Departments recommends a response performance objective of nine minutes or less when measured at the 90th percentile in urban areas, 10 minutes or less in suburban areas, and 14 minutes or less in rural areas served by volunteer or combination fire departments. *NFPA 1710* does not differentiate between the various population densities and assumes that all areas served by career or mostly career fire departments will adhere to a single performance objective. The following figure summarizes each department's travel time performance during calendar year 2013 as recorded within the CAD system.

	NHCFR	WFD
Average	0:05:35	0:04:22
80th Percentile	0:07:10	0:05:33
90th Percentile	0:08:28	0:06:31

When considering the large geographical area of coverage, particularly in the unincorporated portions, it appears that the total response performance for each study area is excellent; however that comparison is based on different criteria within *NFPA 1710* and *1720* and is a bit misleading. It is not feasible to compare the entire unincorporated county to the measurements identified in *NFPA 1710*, which is specific for career departments nor is it a true reflection of performance to simply use *NFPA 1720* in its entirety to measure NHCFR's performance. As ESCI has analyzed the data and method of operation

within NHCFR, it is more apparent that a closer alignment toward response zones based on density would reflect a more realistic measurement due to the wide range of density classes served.

The next section of the report focuses on the support services provided within each department including preventive maintenance and repair, training programs, logistical support services, and fire and life safety services. These activities provide the basis for community risk reduction, preventive maintenance, planning and development, employee training and education, career development, logistical support, public safety education, fire prevention, and code enforcement. Potential efficiencies of each of these areas are addressed within each subsection where appropriate and additional information regarding future cooperative efforts in these areas are discussed later in the report.

While the preceding portions of this executive summary provide a brief overview of the evaluation and update of the current conditions within each organization, the remaining report components, and this executive summary, focus on future cooperative efforts between the study agencies. This section begins with a general review of the various types of strategies that are available to the decision makers including: functional consolidation, operational consolidation, and legal unification.

Functional Consolidation

Public entities usually have broad authority under law to enter intergovernmental agreements (IGAs) for the purpose of cost and service efficiency. North Carolina is no different in this regard. The laws of the State of North Carolina address the issue, allowing intergovernmental contracts for any lawfully authorized governmental function.

Examples of this type of cooperative effort may include any function within the study departments that allows them to deliver services, such as maintenance, training, fire prevention, equipment purchasing, logistics, etc. Through functional consolidations, each agency benefits from the resources of the whole while maintaining independence as separate organizations. Many times, functional consolidations serve as a prelude to a further future collaborative initiative including legal unification and merger.

The following strategies are those that may be implemented as separate, stand-alone agencies, absent legal merger, and that may be viewed as a pre-cursor to future, more formal consolidation and/or merger initiatives.

- Enhanced Use of Mutual and Automatic Aid
- Pre-Incident Planning
- Administrative and Support Services
- Shared Health and Safety Programs
- Apparatus and Equipment Purchasing
- Regionalized Training Opportunities
- Regionalized Fire Prevention and Public Education
- Regional Apparatus and Equipment Maintenance Program

Each of these opportunities is explained in detail within the body of the report and are considered feasible for future cooperative effort.

Operational Consolidation

This strategy joins two or more entities, in their entirety, through the execution of an intergovernmental agreement (IGA). The resulting organization features a single organizational structure and chain of command. Depending on the form of the agreement(s) establishing the organization, members may remain with the original agency, transfer to one of the other agencies, or transfer to an entirely new organization.

Unlike functional consolidation, an operational consolidation brings the actual operations of the separate organizations together into a single department that provides services to one or more communities but does not create a new legal entity. The organizational structure, command, and operational model will depend upon the structure and format of the agreements established between the agencies. Like functional consolidations, operational consolidations are sometimes considered an intermediate step leading to a full merger. The main advantage of the strategy offers governing bodies the ability to negotiate and monitor desirable outcomes for the management of a particular service. This gives a higher level of comfort in going forward with the decision to unify fire service across a geographical region. The following paragraphs review potential operational consolidation efforts that ESCI believes to be feasible for the study agencies.

Status Quo

Any discussion of potential feasible operational consolidation options would be remiss if it did not consider continuation of the current model. In this study area, the current model of providing services independently, while not at optimal efficiency, is a viable option for future service delivery.

The current relationships between the fire departments in New Hanover County and the City of Wilmington have evolved to where they are today and the result has been positive. The current model is a feasible option moving forward and should not be discounted. Service delivery and performance falls within acceptable limits and major problems are not found in the study area overall. However, the question is whether it can be done even better – the subject of the following analysis.

Operationally Consolidated Fire and Emergency Services Delivery

As discussed previously, the governance of a combined organization can take on several forms and in an operational consolidation, typically organizations come together to form a single service provider while maintaining independent control of funding.

The term ‘Fire District’ in North Carolina can take on more than one meaning. For the purposes of this discussion, the term Joint Powers Agreement (JPA) is more appropriate in terms of governance. A Fire District *per se*, will be discussed in the next section.

Joint Powers Agreements (JPAs) are not uncommon in North Carolina and can serve as a valuable tool. State statutes authorize two or more governmental entities to collaborate in exercising any power

common to the jurisdictions and to provide a joint board representing the participating entities and overseeing administrative and management matters.

The advantage of a JPA in this instance is that each entity maintains autonomy regarding taxation and each retains the ability to withdraw from the agreement in the future, given proper notice. As is currently the practice in the study area, each participating entity would levy a tax in its own way (NHCFR through the special district and WFD through the general fund) and then contribute to the operations of the JPA as outlined in the enabling documents. No legislative approval is required for this type of agreement and the intergovernmental agreements created would define how the JPA was governed as well as how each participant is represented.

While the fact that each entity maintains its autonomy can be considered advantageous, it may also be viewed as a drawback. Remaining as separate entities under a JPA, so that a participant can withdraw, lacks a long-term dedicated commitment to the JPA. This can make future planning and visioning more challenging.

In most situations where two or more governmental organizations enter into a shared services agreement through a JPA, the governing board consists of representatives from the participating agencies. Under the assumption that at least one representative from each participating jurisdiction serve on the board of a newly created JPA, in this study area, the board would consist of five members, each with an equal vote. Given the fact that previous efforts at combining resources and/or capabilities between the city and the county have been contentious, it is ESCI's recommendation that two members from each entity be appointed to the governing body and fifth member be appointed from one of the beach communities as an uninvolved neutral party.

Many governing bodies find it difficult to reach consensus on a majority of issues when the membership of the board surpasses five to seven members. This is not to say that larger boards cannot be productive but rather to urge that smaller boards are more efficient at dealing with public safety issues. In the case of the study region, ESCI recommends a board of no more than seven individuals with representation based on a similar weighting as mentioned above. Prior to discussing alternative assessments, fees, or other increases to the current revenue stream, the governing boards of the participating agencies should clearly define the level of community emergency service in measurable terms. For example, the boards should specify the service (fire protection), the quantity (a fire engine and three firefighters), the quality (within six minutes of dispatch), and the accuracy (80 percent of the time). Once service is defined in specific and measurable terms, the tasks of determining cost and the consideration of funding alternatives become more focused.

Legal Unification

Under certain circumstances in law, fire departments can join into a single entity. This formal approach unites not only the programs but also the organizations themselves. State laws addressing political subdivisions usually detail a process for legal unification.

Typically, state laws draw a distinction between words like *annexation*, *merger*, and *consolidation* when speaking of legal unification. Organizationally, however, the outcome of any such legal process results in one unified organization. The primary differences between the legal strategies relate to governance and taxation issues. In many states, some process of *inclusion* exists that essentially involves the annexation of one entity into another, preserving the governing body and taxing authority of the surviving agency. A legal merger, on the other hand, usually entails the complete dissolution of two or more agencies with the concurrent formation of a single new entity (and governing body) in place of the former.

Section 153A-233 of the NCGS authorizes a county to establish and maintain a county fire department. Given the costs of doing so, most counties do not opt for this model but rather contract with one or more entities. New Hanover County is one of only a few county fire departments in North Carolina. As such, the county established a special service district to fund the fire services in the unincorporated areas of New Hanover County. Since the consolidation of all fire protection services in unincorporated New Hanover County, the county has operational control over all aspects of those services outside the City of Wilmington and the beach communities.

Under state law, a county service district (like the existing fire service district) cannot include territory lying within the corporate limits of a city unless the governing body of the city agrees by resolution to include. In other words, if the city were to move forward with the county as a unified county fire department, the city would adopt a resolution effectively relinquishing its control of fire protection to the county. Conversely, the county could govern the special district and fund with a single tax applied to all property within the district (including the city) and then contract with the city to provide services to the entire service district.

The ideal or optimum model for governance in a legal unification is an independent taxing district that serves as a quasi-governmental entity, is governed by elected representatives from the community or communities served, and has the authority to levy taxes as set by the governing board. Statutory allowances to accommodate various forms of merger and consolidation are limited in North Carolina law and to achieve some forms of unification, legislative action may be necessary to provide the authority to do so. Currently, independent fire districts are not addressed within the general statutes.

Because ESCI often finds that study agencies are reluctant to relinquish control of their respective fire departments to a full consolidation, the intent of this project is to evaluate potential opportunities and to provide information to policymakers so they can make informed and successful decisions regarding the future of fire protection and emergency services within their respective communities.

In order to build estimates of what a future consolidated department may cost, ESCI first had to make certain assumptions.

1. The operational service delivery model would remain constant or improve.
2. The service delivery performance objectives would remain constant or be improved.
3. Administrative and support services would be consolidated into a single facility (some code enforcement functions are already co-located at the New Hanover County government center).

4. The organization would only require one fire chief.
5. All administrative and support position titles would be merged (to be determined by the governing body of the organization prior to implementation).
6. Operational ranks and titles would be merged (to be determined by the governing body of the organization prior to implementation).
7. Methods of funding will be determined by the governing bodies and the final governance model chosen.

To build a base from which to estimate future costs, ESCI developed a sample staffing strategy that the project team feels accomplishes the goals of the consolidated organization and maintains critical functions while improving efficiency and reducing cost.

The following figure illustrates that example but should **NOT** be considered as the final structure of the consolidation organization. This sample is for base estimating purposes only.

Position	NHCFR	WFD	Proposed	Description
Fire Chief	1	1	1	
Deputy Chief	0	2	2	Operations, Administration and Support
Assistant/Division Chief	3	0	4	Safety, Fire & Life Safety, Training, Logistics
Battalion Chief	1	5	0	
Inspector (All Ranks)	3	5	8	
Training Officer (All Ranks)	2	4	6	
Firefighter	0	4	0	
Educator	.5	1.5	2	
Garage Supervisor	0	1	1	
Mechanic	0	2	3	
Hydrant Tech.	1.5	0	2	
Logistics Staff	1	1	2	
Analyst	1	2	2	
Clerical	2	4.5	6	
Total	16	33	39	

The example administrative and support complement as outlined above eliminates several positions that, through consolidation, could be considered redundant and increases other positions where appropriate. The consolidated system would have a single fire chief to oversee the department, two deputy chiefs dedicated to operations and administration, four assistant/division chiefs overseeing safety, fire and life safety programs, training, and logistics. Eight inspectors including both current captain and firefighter ranks, six training officers that would work under the assistant/division chief of training, and two educators would work under the deputy chief of fire and life safety and be responsible for public education activities. A maintenance supervisor would oversee three mechanics responsible for all departmental fleet and equipment repairs and periodic maintenance. Two logistics staff would report to the assistant/division chief of logistics and work to ensure that each station is supplied as necessary. Two data analysts will continually work to ensure that accurate data is available to the department for

quality assurance and improvement purposes and six clerical staff would support each of the division heads and the fire chief.

It should be understood that some, or all, of the potential savings from the creation of a single organization would come through attrition rather than being realized immediately. From an operational perspective, the future deployment model reallocates some resources based on a consolidated system as outlined in the following figure.

	Engine	Truck	Rescue	Command	Safety	Total Staffing – per Shift	Total Staffing
Station 1	2	1		1		13	39
Station 2	1		1			8	24
Station 3	1					4	12
Station 4	1			1		5	15
Station 5	1	1				8	24
Station 6	1					4	12
Station 7	1	1				8	24
Station 8	1	1			1	9	27
Station 9	1					4	12
Station 10	1			1		5	15
Station 11	1					4	12
Station 12	1					4	12
Station 13	1					4	12
Station 14	1					4	12
Station 15	1					4	12
Station 16	1					4	12
Station 17	1	1		1		9	27
Station 18	1	1				8	24
Station 19	1					4	12
Total Apparatus	20	6	1	3	1	113	339

Based on the example apparatus deployment above, the second engine at Station 1 is moved to become a truck at Station 18. Also, given the assumed erasure of district boundaries, the geographic area and the community risk, only one rescue would be deployed centrally and all ladder companies would be equipped with rescue equipment. Deployment of personnel across the ranks would follow the example below.

Position	NHCFR	WFD	Total	Proposed
Division Chief	0	0	0	3
Battalion Chief	3	6	9	9
Captain/Lieutenant	27	48	75	81
Apparatus Operator/Engineer	49	0	49	81
Master Firefighter	0	45	45	0
Safety	0	3	3	3
Firefighter	18	90	108	162
Total	97	192	289	339

The example staff distribution by rank also redeploys several positions as was done with apparatus. One division chief will be assigned to each shift to serve as the overall organization command officer 24-hours/day and three battalion chiefs will be assigned to each shift (north, central, and south). Each engine company is assigned one captain, one engineer/apparatus operator and two firefighters. This is a departure from current staffing practices where, in some cases, only three personnel are assigned to an engine. This increase in staffing is in line with WFD's recently approved reconfiguration of resources and will make all units consistent throughout the overall response area. All truck and rescue companies are staffed with four personnel comprised of a lieutenant, engineer/apparatus operator, and two firefighters.

The example personnel distribution is based on filled positions and does not consider benefit leave or other vacancies. In order to generate an FTE estimate, ESCI uses a factor of 1.2 to estimate the total number of personnel necessary to maintain staffing levels and accommodate benefit leave and absences. Considering this factor, the total FTE requirement is estimated at 393 operational personnel. This represents an overall increase in total personnel FTEs of 48. This does not take into account the proposed reduction in administrative and support personnel by 10 positions. This would translate into an overall increase in personnel expenditures but the improvement in service delivery should outweigh that cost.

The remainder of the full report provides guidance to elected and appointed officials regarding establishing an implementation committee and specific working groups to tackle the specifics of the cooperative effort. This process should begin by conducting a vision session with policy makers to determine how, or if, the two organizations should proceed. This does not mean that consolidation is a foregone conclusion but, rather, provides a forum for the policymakers to direct staff to provide additional information and have working groups come back to the larger committee with details as to how implementation will occur. This process should result in the preparation of an implementation planning document that can be shared with the policy body, stakeholders, and others who will be involved in or affected by the implementation process. The document should provide the joint vision, the desired outcome, the goals that must be met in order for implementation to be achieved and the individual objectives, tasks, timelines for accomplishment, and describe the cooperative service strategy or strategies being pursued,.

Over the past several years, NHCFR and WFD have enjoyed an increased atmosphere of coordination and cooperation. This includes consistent standard operating guidelines, enhanced mutual and automatic aid response, closest unit response regardless of jurisdiction, etc. Moving in the direction of a more cohesive and consolidated organization is the next logical step. While full consolidation of the organizations into a single entity may be politically or culturally charged, the operations and service delivery to the communities will only improve. Policymakers should take advantage of the current level of cooperation between the two organizations and seriously consider how to better serve the communities as a whole through further cooperative efforts. Any of the identified strategies are considered to be feasible and only political will can determine how far to expand and what strategies to implement. However, it is the opinion of ESCI that bringing these two departments together to form a single entity is in the best interest of both the City of Wilmington and New Hanover County. Efficiencies of scale and an overall improvement in service delivery will be the result, which will directly impact the citizens throughout both communities. Below is a partial list of advantages and disadvantages of a combined organization.

Advantages

- Economies of scale can be realized through the larger organization.
- Service delivery will be improved across the entire county, including the City of Wilmington.
- Future potential to bring in other partners such as the beach communities.
- More consistent and coordinated emergency response.
- Greater efficiency in the administrative and support elements.
- Increased staffing to the unincorporated areas and increased ability to assemble resources quickly.

Disadvantages

- Funding of the combined organization may be difficult to determine at the outset but future strategies could produce a lower cost to the consumer.
- Potential for increased cost up front but the potential for greater efficiencies in the future through attrition.
- Loss of control and/or oversight by one or both of the current government entities.

This should serve as only a partial list but, in ESCI's opinion, the advantages of a combined fire protection and emergency services system that covers all of the unincorporated areas of New Hanover County as well as the City of Wilmington far outweigh the disadvantages. The discussion surrounding this issue has taken place for many years and now is the time to move forward. It should be understood, however, that making the decision to move forward does not bind either organization to consolidation. Moving forward simply means deciding to evaluate the potential further by creating the implementation committee and working groups to evaluate the details of the shared service opportunities. This process should not be rushed nor should any foregone conclusions be assumed. Involvement by all levels of both organizations will be critical in the success of the process.

ESCI began collecting data and information for this project in February 2014 and the review, evaluation, and analysis of that data necessary to complete this document has taken nearly three months. It is the project team's sincere hope that the information contained within this report is found to be useful in allowing policymakers to make an educated decision about the future provision of fire protection and emergency services delivery to their respective communities.

Introduction

Emergency Services Consulting International (ESCI) was engaged by New Hanover County and the City of Wilmington, NC to conduct an update to previous evaluations done on each jurisdiction's fire department and to provide them with feasibility options for future collaborative and cooperative efforts. This report serves as the culmination of those updates and options analyses and begins with a review of each department's populations, demographics, infrastructure and resources, followed by an analysis of service delivery components including demand, distribution, concentration, reliability and response performance.

ESCI has worked with each community several times over the last 15 years providing agency evaluations and cooperative efforts feasibility analysis as follows:

1998 – Cooperative Efforts Feasibility Study (New Hanover County)

2006 – Fire Department Assessment (Wilmington Fire Department)

2009 – Cooperative Efforts Feasibility Study (New Hanover County)

As a result of these studies, in part, each agency has progressed and addressed many of the issues addressed within each individual project. Fire service in New Hanover County has been transformed from a fragmented system where multiple private not-for-profit fire departments worked in concert with New Hanover County Fire Services (NHCFR) to a single provider, county operated system that is fully integrated in providing services to the unincorporated areas of the county. Wilmington Fire Department (WFD) has, through a process of administrative and organizational changes, worked to replace outdated facilities and equipment and improve the overall level of service being provided to the citizens of the City of Wilmington.

The departments in recent years have opened the lines of communications and are now working more cooperatively than ever before. One such example is providing a closest unit response along jurisdictional boundaries so that overall service levels improve to all citizens regardless of where they live. Both departments should be commended for this approach to cooperative efforts while maintaining independence and individual identity.

A WORD ABOUT BENCHMARKS AND COMPARISONS

Throughout this document, a number of benchmarks are provided that represent how each department compares against national and regional published data. Unfortunately, published benchmark data within the fire service has historically been limited to comparisons based solely on populations. However, as any emergency services provider will attest to, each community is different regarding populations, demographics, geography, and community risk.

Most of the benchmarks provided within this document are extracted from a report published by the National Fire Protection Association, Fire Analysis and Research Division. This annually produced Fire Department Profile contains information relative to elements such as: Firefighters by Population (career and volunteer), Average Apparatus and Stations by Population, and Direct Expenditures for Fire

Protection. The publication provides national data as well as regional data broken into the Northeast, Midwest, South and West. North Carolina falls into the South Region along with Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Oklahoma, South Carolina, Tennessee, Virginia and West Virginia. The data is also segregated into population levels as follows.

- 1,000,000 or more
- 500,000 to 999,999
- 250,000 to 499,999
- 100,000 to 249,999
- 50,000 to 99,999
- 25,000 to 49,999
- 10,000 to 24,999
- 5,000 to 9,999
- 2,500 to 4,999
- Under 2,500

The report used data collected through the NFPA's annual Survey of Fire Department for U.S. Fire Experience. The data is collected each year and released in October of the following year. Thus the data used for this report, is from 2012 information that was published in October 2013.

As mentioned previously, the data, and the comparisons that it provides, bases all statistics on population and ignores other important components. To this end, ESCI also obtained a publication for the N.C. School of Government entitled, *Municipal Benchmarks: Assessing Local Performance and Establishing Community Standards* published in 2012. Where appropriate, information from this publication is also provided but, it should be understood that national and regional data from that book was also obtained from the NFPA reports noted above. While some individual data from select cities is provided in the book, no comparison is provided in regard to demographics, geography or community risk.

Although these other elements that are important characteristics to include in benchmarks and comparisons, a large degree of community risk is based on population and human activity. Those areas with higher population densities tend to have higher service demand volumes (urban and suburban areas) while those with lower population densities tend to experience lower service demand (rural areas). Also, the types of services provided by each agency should be taken into account. Those providers that are actively involved in the provision of EMS (either first response or transport) will have a significantly higher service demand than those that are not. Likewise, those communities with older populations will likely see higher service demand than younger communities. Since population is such a major contributor to service demand, therefore a determinant in resources allocation, ESCI polled the

five most similar N.C. communities to both New Hanover County and the City of Wilmington from which to draw comparisons.

Figure 1: Comparable N.C. Communities

County	Population	City	Population
• Durham County	286,142	• Concord	81,461
• Buncombe County	248,929	• Greenville	86,142
• Union County	211,558	• Asheville	86,207
• Gaston County	209,606	• High Point	106,406
• New Hanover County	209,234	• Wilmington	109,689
• Onslow County	193,911	• Cary	142,412

While municipal (city) fire protection is relatively standardized in the type of organizational structure, fire protection and other emergency services to unincorporated areas is another matter. The comparison of resources (facilities, apparatus and staffing) for municipal departments is pretty straightforward. A simple survey of those departments is typically all that is required. For county agencies, however, the task is not so easy. As already mentioned, New Hanover County transformed its fire service to a single-provider system based on the outcome of previous work done by ESCI and the hard work completed by county personnel. In such, NHCFR is the only county fire department in N.C. that is the sole provider of fire protection and rescue services to unincorporated areas. Most counties in N.C. remain as New Hanover County once was in that they have retained the multiple provider system. Therefore, there are no comparable systems within North Carolina that are similar to NHCFR. Therefore, the following counties were also polled based on population.

- Washington County, Pennsylvania 208,716
- Henry County, Georgia 209,053
- **New Hanover County, NC 209,234**
- Washington County, Arkansas 211,411
- Yavapai County, Arizona 212,637

Of the counties noted above, only Henry County, GA operates a county-wide fire department. That department is used for comparative purposes where appropriate throughout this report as well.

Although population is a major factor in determining benchmark comparisons, the more important factors are demographics, geography and community risk as already mentioned. For instance, although a department within the inland portions of N.C. may have similar populations as New Hanover County or the City of Wilmington, it would not contain the same risks such as hurricanes or coastal flooding or sea rescue. Likewise, New Hanover County is the second smallest county in N.C. geographically, which imparts a different population density than a similarly populated county that is much larger in land size. In short, each community contains its own unique set of features that determine a fire departments level of resource allocation. The benchmarks and comparisons in this report should be taken as a whole rather than individually and no decision should be made regarding resource allocation on any single benchmark or comparison.

Evaluation of Current Conditions

Over the past decade, Emergency Services Consulting International (ESCI) has worked with New Hanover County and the City of Wilmington to evaluate fire and emergency services, provide guidance regarding the consolidation of services in the unincorporated areas, conduct executive search services, and assist with future planning. ESCI was once again engaged by the city and the county to update previous fire department evaluations and provide an analysis on the feasibility of consolidating city and county fire services. This report is the culmination of those tasks and begins with an overview of each department. Within many of the report sections, tables are presented that summarize the elements of that respective section. This is not to simply compare the two organizations against one another but, rather, to establish a baseline of differences that can be lessened through cooperative efforts. Viewing these elements individually does little in the way of determining how one department is operating in comparison to the other since the service delivery models, geographies, population density, etc. vary.

ORGANIZATION OVERVIEW

New Hanover County Fire Rescue (NHCFR)

New Hanover County Fire Rescue (NHCFR) serves the unincorporated areas of New Hanover County as a combination career/volunteer all-hazards emergency services provider. The department serves a population of approximately 88,832¹ in an area of approximately 138.7 square miles resulting in an overall population density of 669 persons per square mile. Information regarding increases or decreases in daytime population due to commuting was not available but considering the close proximity to beach communities, it is assumed that the general population dramatically increases during the summer months. NHCFR operates as a fire service district within the overall organizational structure of New Hanover County government. The special fire district is funded through a separate levy from the general fund and is self-supporting. The fire chief reports to the county manager.

The department operates from eight strategically located operational facilities (stations) and an administrative office co-located with county administration. The department operates a fleet of eight engines, two aerial ladder, two rescue apparatus, seven tenders, four wildland vehicles and a number of reserve, ancillary and support vehicles. The department's administrative personnel consist of the fire chief, three deputy fire chiefs, and 11 support and clerical personnel. Operational personnel consists of 102 total positions that provide a wide range of services including fire suppression, basic life support (BLS) emergency medical first response, vehicle extrication, hazardous materials at the operations level, high-angle rope rescue, water rescue, structural collapse, confined space rescue, urban search and rescue and wildland search and rescue.

City of Wilmington Fire Department (WFD)

Wilmington Fire Department (WFD) serves the City of Wilmington, NC as a fully career all-hazards emergency services provider. The department serves a population of 109,922² in an area of 52.8 square miles resulting in a population density of 2,082 persons per square mile. As the largest city in New

¹ 2012 Census estimate.

² *Ibid.*

Hanover County, the city serves as the hub of commerce, which generates an additional 27,811 in population during daytime hours due to commuter traffic.³ In addition, it is assumed that the general population increases dramatically during the summer months. WFD is a general fund department within the overall organizational structure of the City of Wilmington and the fire chief reports to the city manager.

The department operates from 11 strategically placed operational facilities (fire stations) with a fleet of 12 engines, two aerial ladders, one rescue apparatus, four brush/wildland units, and a number of other ancillary and support vehicles. The department's administrative personnel consists of the fire chief, two assistant chiefs, five battalion chiefs and nine support and clerical personnel. Operational personnel consists of 189 total positions that provide wide range of services including fire suppression, BLS emergency medical first response, vehicle extrication, hazardous materials at the technician level serving as a regional response team, high-angle rope rescue, water rescue, structural collapse rescue, and urban search and rescue.

The following figure provides a visual of the overall service area followed by a summary the organizational overview elements.

³ <http://www.city-data.com/city/Wilmington-North-Carolina.html>. Accessed 9 April 2014.

Figure 2: Study Area Base Map

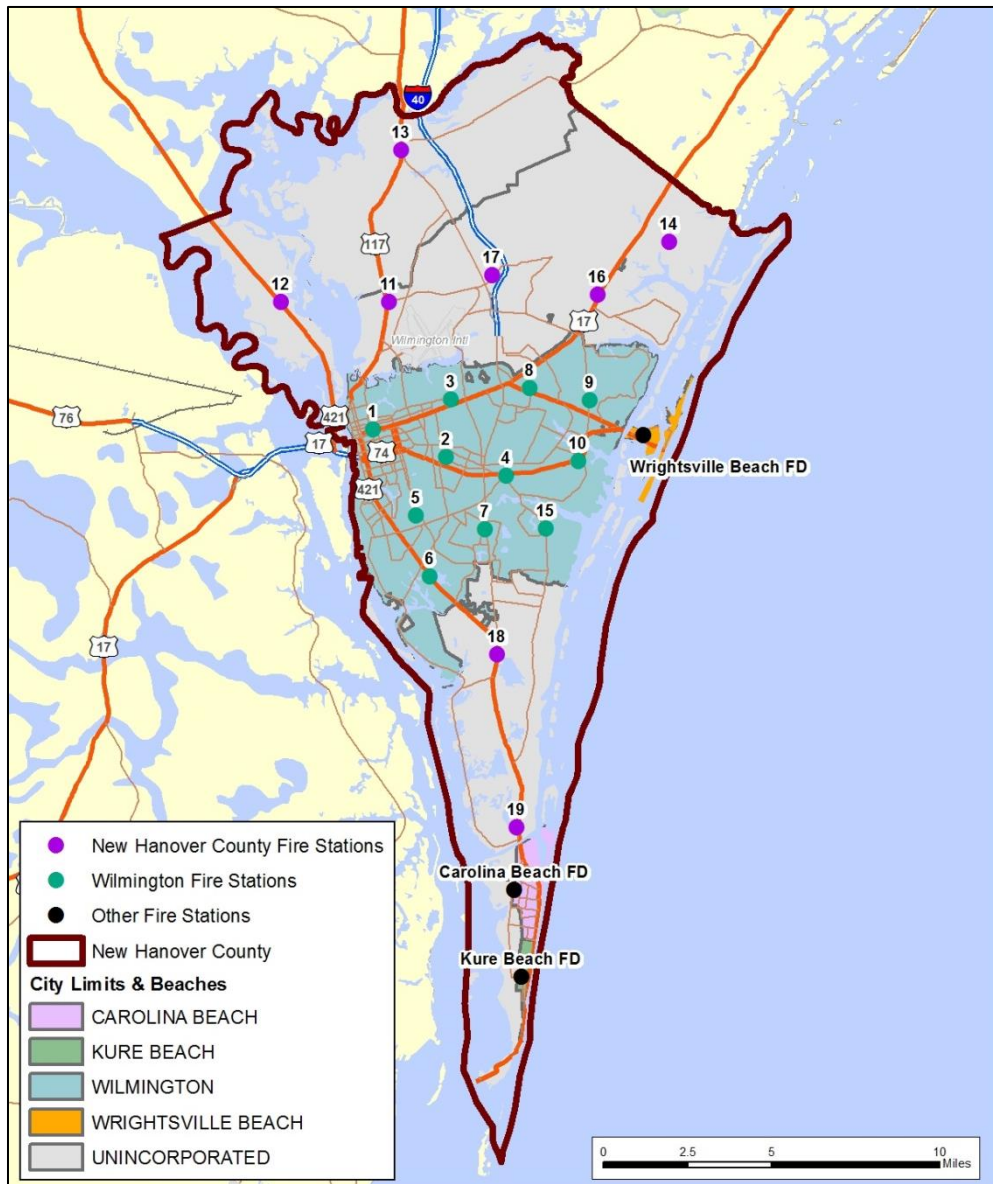


Figure 3: Summary of Organizational Overview Elements

	NHCFR	WFD
Department Name	New Hanover County Fire Rescue	Wilmington Fire Department
Department Preferred Acronym	NHCFR	WFD
Governance Authority	Direct operating department of	Direct operating department of
Municipality Name	New Hanover County	City of Wilmington
Jurisdictional Limits	Duplicates the governmental boundaries of the community with the exception of the incorporated areas and also serves a small contract area in Pender County	Duplicates the governmental boundaries of the community
Primary Risk Types	Heavy industrial, urban residential and commercial, suburban residential and light commercial, rural residential and light agricultural, community college	Urban residential and commercial, suburban residential and light commercial, industrial, university, community college, state ports, tank farms and two major hospitals
Year Agency Formed	1997	1897
Services Provided	Fire suppression, BLS emergency medical first responder, vehicle extrication, hazmat operations-level, technical rescue – high-angle rope, confined space rescue, trench collapse rescue, structural collapse rescue, wilderness search and rescue, marine water rescue, public education, code enforcement and inspections, fire investigations	Fire suppression, BLS emergency medical first response, vehicle extrication, hazmat technician level, technical rescue – high-angle rope, surface water rescue, underwater dive rescue, structural collapse rescue, confined space rescue, trench rescue, urban search and rescue, marine and shipboard firefighting, public education, code enforcement, inspection, fire investigations, community risk reduction
Technician-Level Hazmat Services Provided By	Regional hazmat team in which this agency does not participate	Regional hazmat team hosted by this agency
Hazmat Team Name	RRT-2	RRT-2
Dispatch Agency	County	County
Staffing Methodology	Career firefighters on duty 24-hours a day, limited volunteer/paid-on-call (POC) responders	Career firefighters on duty 24-hours a day
Minimum On-Duty Strength or	34	48

	NHCFR	WFD
Typical On-Call Availability		
Latest ISO Rating	4/9E	2
Last ISO Survey Conducted In	2011	2005
Accredited Agency	No	Yes

Governance and Lines of Authority

Any formal organization, regardless of mission, must have some form of governance and operate under specific lines of authority. The fire service is no different. Within the fire service, this can take many forms: from independent taxing district, to dependent taxing district, to municipal department, to private provider. While the number of private providers within the fire service is limited in the United States, a large percentage of departments, particularly those servicing urban and suburban areas, are municipal in nature; as is the case in New Hanover County and Wilmington. The following figure summarizes the governance and lines of authority elements.

Figure 4: Summary of Governance and Lines of Authority Elements

	NHCFR	WFD
Municipality or Organization Type	County	City
Taxing Authority	Chartered for the purpose of providing emergency service to the community and qualifies to enter agreements with the governmental jurisdiction to provide said services on its behalf	Chartered for the purpose of providing emergency service to the community and qualifies to enter agreements with the governmental jurisdiction to provide said services on its behalf
Form of Government	Commission - Manager	Council - City Manager
Title of Governing Authority or Body	Board of Commissioners	City Council
Governing Authority Number of Members	5	7
Title of Governing Authority Executive	County Manager	City Manager
Agency Authorization Document	Constitution and by-laws	City Charter
Fire Chief Status	At-will employee with no personal contract	At-will employee with no personal contract

Organizational Design

Fire departments, dependent upon size, typically follow a fairly narrow, top-down organizational structure. This type of structure ensures that chain of command is clear and that each member knows to whom they should report. In most organizational theory models, span of control for any supervisor should be limited to between four and six individuals. This model evolved from historical military command structures and is intended for high-stress environments. Many emergency services organizations have adopted this model for reducing span of control with significant success, particularly in emergency incident situations. The figures below illustrate the organization structure of each study agency.

Figure 5: NHCFR Organizational Structure

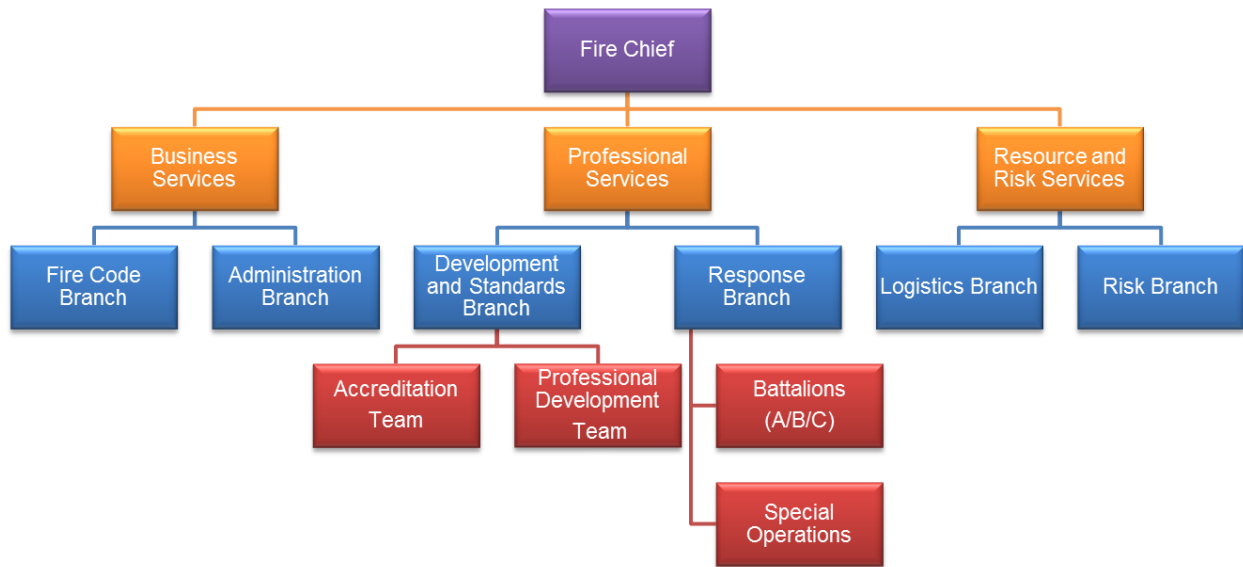
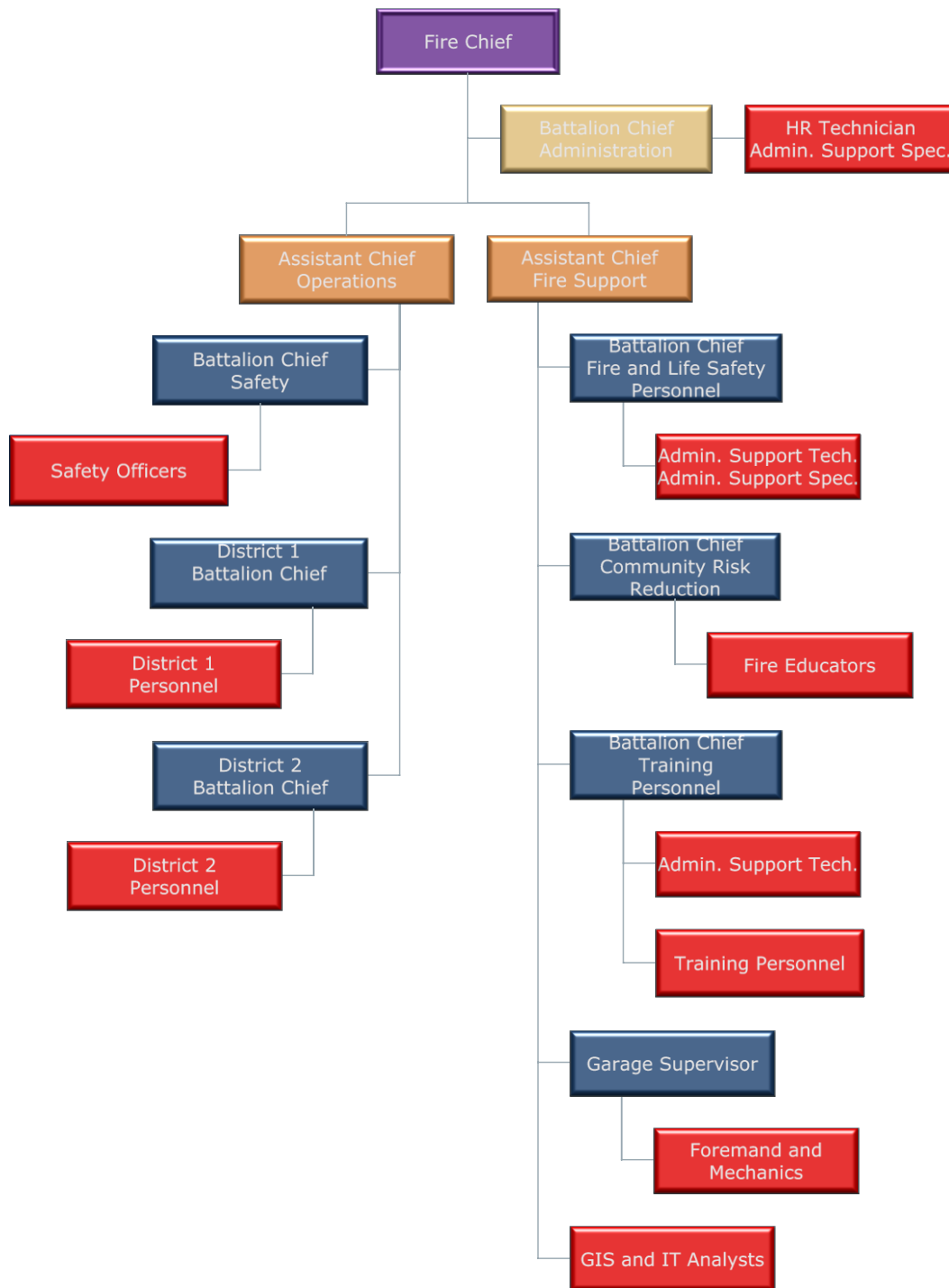


Figure 6: WFD Organizational Structure



Although organized in different manners, the previous figures illustrate that each department has a clear unity of command and are organized with clear operating divisions with assigned program

managers. Each fire chief's span of control is limited through delegation of responsibilities to other chief officers. The following figure summarizes the organization design elements.

Figure 7: Summary of Organizational Design Elements

	NHCFR	WFD
Department Has Clear Unity of Command	Yes	Yes
Department Organized With Clear Operating Divisions	Yes	Yes
Specific Programs With Managers Designated	Yes	Yes
Chief's Span of Control	3	5

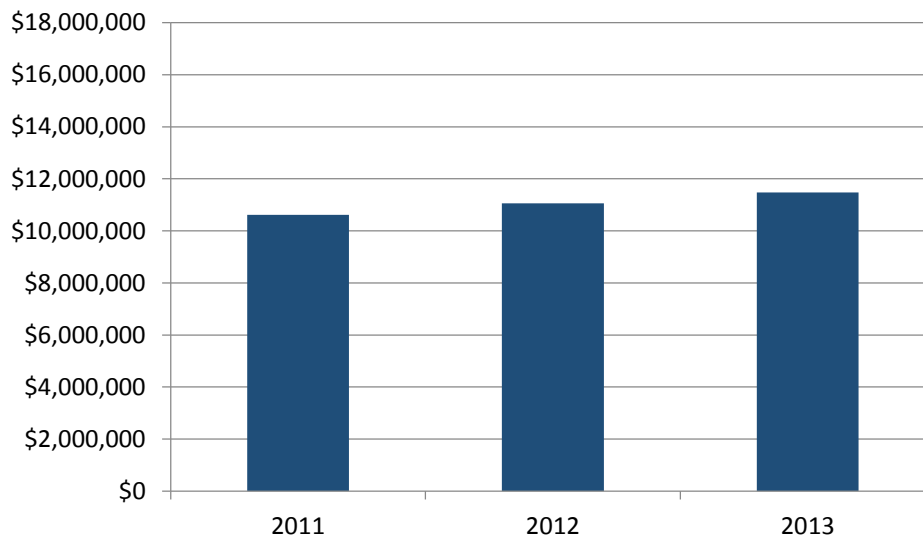
Budget, Funding, Fees, and Taxation

The fire service is dependent upon sufficient funding to provide the appropriate facilities, apparatus, and staffing to support service delivery. ESCI reviewed financial information provided by each agency to determine the adequacy of organizational funding.

New Hanover County Fire Services (NHCFR)

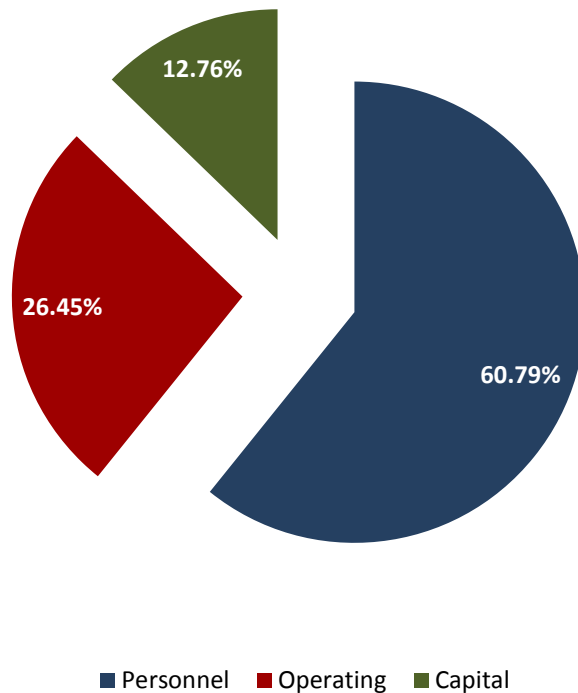
As mentioned previously, NHCFR is a special fire service district and is funded through a dedicated levy specific to providing fire and emergency services. Over the last three years, the department's overall budget increased 8.11 percent as illustrated in the following figure.

Figure 8: NHCFR Historical Budget



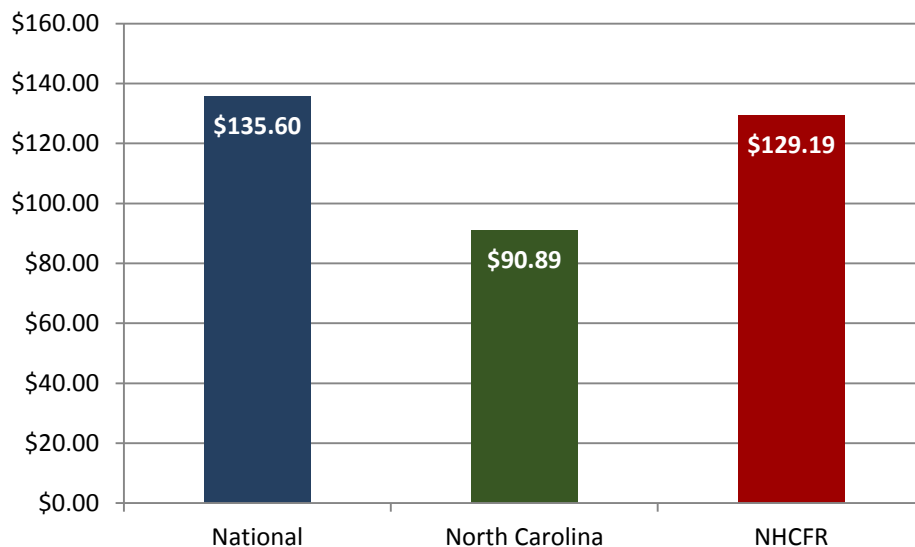
Personnel costs increased 6.1 percent while operating costs increased 24.7 percent over the three year period. Over that same time, capital expenditures decreased 8.8 percent. As with any mostly career emergency services organization, a majority of NHCFR's budget is dedicated to personnel costs as illustrated in the following figure.

Figure 9: NHCFR Budget Distribution 2013



Although presenting the figures above gives the reader a general idea about how much it costs to operate NHCFR, a better illustration is how that cost compares to other organizations serving similar populations. The following figure provides a comparison against the state and national medians.

Figure 10: Comparison to State and National Median Cost per Capita – NHCFR

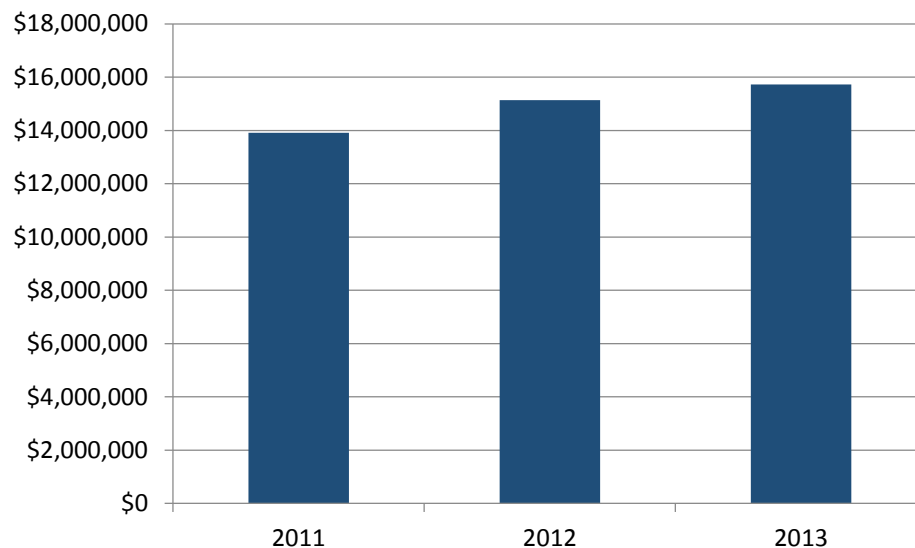


As shown in the figure, the cost per capita to provide services to unincorporated New Hanover County is lower than the national average but higher than the state average. It should be understood that this benchmark comparison does not take into account the type of organization (career vs. volunteer) and only provides information relative to total budget divided by total resident population.

City of Wilmington Fire Department (WFD)

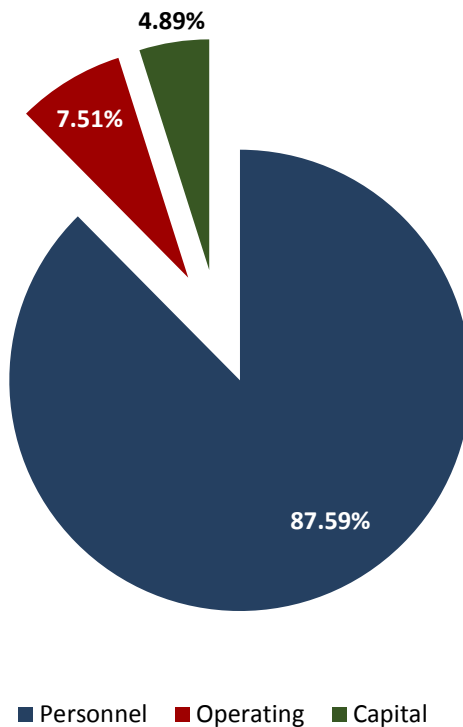
Unlike NHCFR, WFD is a general fund department within the overall taxation authority of the City of Wilmington. As such, no separate tax is levied to support the fire service specifically. Rather, the city's ad valorem taxation is levied to provide all city services that are contained within the general fund. The following figure illustrates how WFD's budget has changed over the last three years.

Figure 11: Budget History – WFD



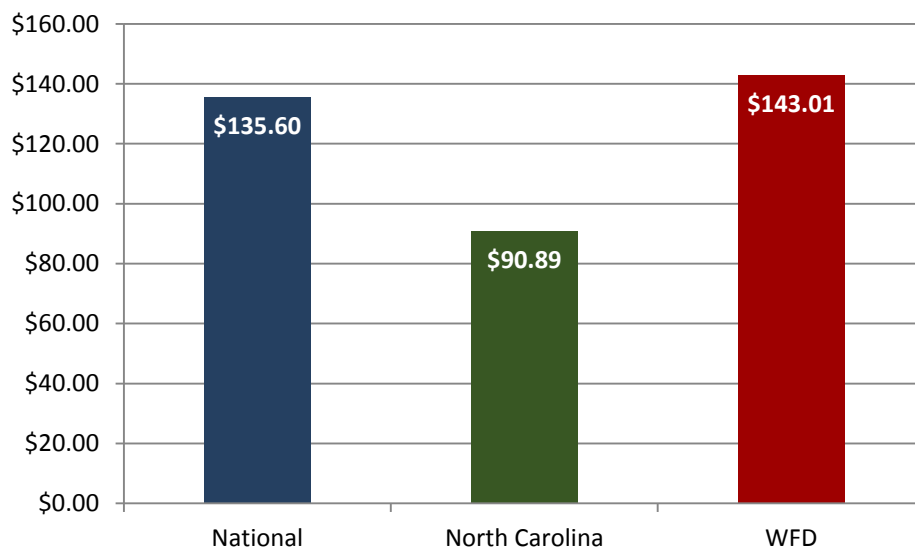
Overall, WFD's budget has increased 13.0 percent over the three year period. The department's operating budget (within the 'operating' section) includes an annual charge of \$713,838 for central services to pay for capital replacement. Applying this amount to the capital line of WFD's budget results in a net decrease in capital of 5.9 percent over the past three years. Additional capital replacement may be included in other parts of the city's overall budget but are not considered within WFD's operating budget. Last year's overall budget distribution is represented in the figure below.

Figure 12: Budget Distribution 2013 – WFD



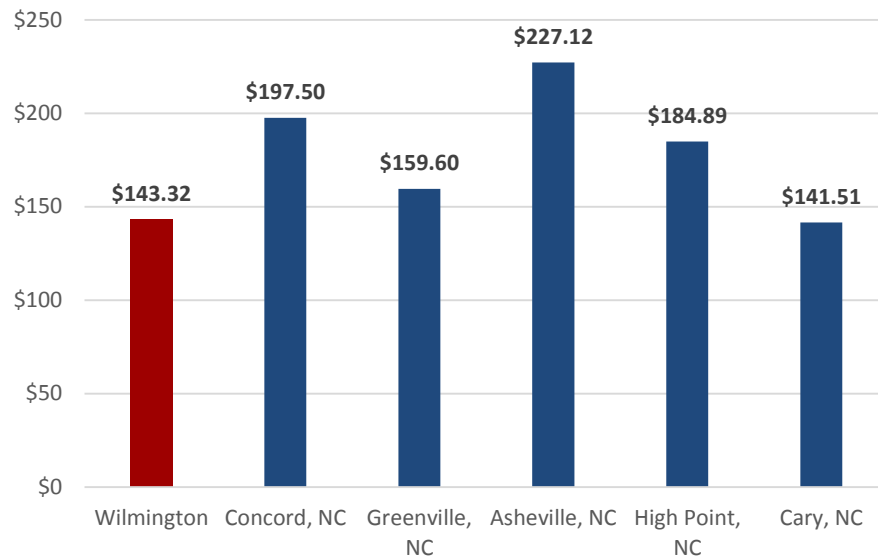
The same comparison as presented previously for NHCFR is provided here regarding WFD and how they compare to the state and national averages in cost per capita.

Figure 13: Comparison of Cost per Capita 2013 – WFD



Based on the gross departmental budget divided by the resident population, WFD's costs are slightly higher than the national average and well above the state average. This is not to say that the department is too expensive or inefficient. The same caveat presented earlier applies here in that all departments are included in the benchmark data including totally volunteer department that have very low overall operating budgets. The figure below illustrates how WFD compares against five similarly populated cities in N.C. as discussed in the introduction of this report.

Figure 14: Cost per Capita (NC Benchmark)



Based on this comparison, WFD is the second lowest department in regard to cost per capita higher only than Cary.

Section Observations:

Below are recommendations contained within the previous agency evaluations that have not been implemented and are still recommended for consideration by the respective department.

New Hanover County 1998 Feasibility Study

- All recommendations have been addressed.

New Hanover County 2009 Feasibility Study

- All recommendations have been addressed.

City of Wilmington 2006 Fire Department Assessment

- All recommendations have been addressed.

CAPITAL ASSETS AND CAPITAL IMPROVEMENT PROGRAMS

Aside from personnel, capital assets can be a fire department's largest expense; without proper upkeep and replacement planning, facilities and apparatus can fall into disrepair and fail at a critical time. This section evaluates the capital assets of both organizations.

Facilities

Fire stations play an integral role in the delivery of emergency services for a number of reasons. A station's location will dictate, to a large degree, response times to emergencies. A poorly located station can mean the difference between confining a fire to a single room and losing the structure. Fire stations also need to be designed to adequately house equipment and apparatus, as well as meet the needs of the organization, its workers, and/or its members. It is important to research need based on call volume, response time, types of emergencies, and projected growth prior to making a station placement commitment. The following figures summarize ESCI's non-engineering/non-architectural review of facility inventory within the study area.

New Hanover County Fire Services (NHCFR)

The following figure identifies NHCFR's station locations and minimum staffing complement.

Figure 15: NHCFR Stations and Minimum Staffing

Station	Address	Minimum Staffing
Admin. Offices	230 Government Center Dr.	N/A
Station 11	3515 N Kerr Ave	5
Station 12	3805 US 421 N	3
Station 13	5311 Castle Hayne Rd	3
Station 14	8310 Sharaz Way	3
Station 16	7375 Market St	3
Station 17	5901 Murrayville Rd	7
Station 18	5636 Carolina Beach Rd	6
Station 19	9815 River Rd	4

City of Wilmington Fire Department (WFD)

The following figure identifies WFD’s station locations and minimum staffing complement.

Figure 16: WFD Stations and Minimum Staffing

Station	Address	Minimum Staffing
Headquarters	801 Market Street	10
Station 2	3403 Park Ave	6
Station 3	3933 Princess Place Dr	3
Station 4	310 Wallace Ave	3
Station 5	1502 Wellington Ave	3
Station 6	2929 Carolina Beach Rd	3
Station 7	3230 S College Rd	6
Station 8	601 Eastwood Rd	4
Station 9	1201 Military Cut-Off Rd	3
Station 10	6102 Oleander Dr	4
Station 15	3335 Masonboro Loop Rd	3

While the previous figure only identifies the locations and staffing for WFD stations, this information will be used to identify potential efficiencies that could be gained through expanded cooperative efforts in the future.

Apparatus

Other than the emergency responders, response vehicles are the next most important resource of the emergency response system. If emergency personnel cannot arrive quickly due to unreliable transportation, or if the equipment does not function properly, then the delivery of emergency service is likely compromised.

Fire apparatus are unique and specialized pieces of equipment, customized to operate efficiently for a narrowly defined mission. For this reason, fire apparatus are very expensive and offer little flexibility in use and reassignment. As a result, communities always seek to achieve the longest life span possible for these vehicles. The following figures provide an overview of each organization’s apparatus fleet as submitted by the departments.

New Hanover County Fire Services (NHCFR)

The following figures summarize the primary apparatus within the NHCFR fleet.

Station: 11 Address: 3515 N Kerr Ave

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 11	Engine	2007	Pierce	Good	3	1,500	1,000
Rescue 11	Rescue	2005	Kenworth	Good	2	N/A	N/A
Tender 11	Tender	2011	Pierce	Good	Cross	500	2,100
Tender 11-1	Tender	1996	Volvo	Good	Cross	1,250	2,500
Rehab 11	Truck	1992	Ford	Good	Cross	N/A	N/A
Brush 11	Wildland	1984	Chevy	Good	Cross	125	180

Station: 12 Address: 3805 US 421 N

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 12	Engine	2006	E-One	Good	3	1,500	1,000
Brush 12	Wildland	1995	Dodge	Good	Cross	250	300
Tender 12	Tender	2014	Pierce	New	Cross	500	2,100
Tender 12-1	Tender	1998	Ford	Good	Cross	400	2,000
Tech Rescue Trailer	Trailer	1998	Interstate	Good	0	N/A	N/A

Station: 13 Address: 5311 Castle Hayne Rd

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 13	Engine	2013	Pierce	Excellent	3	1,500	1,000
Squad 13	Squad	2006	GMC	Good	Cross	300	300
Marine 13	Boat	2007	Zodiac	Good	Cross	N/A	N/A
Marine 13-1	Boat	1997	Voyager	Good	Cross	N/A	N/A
Reserve 96	Engine	1998	Sutphen	Good	Cross	1,250	1,000
Reserve 99	Engine	1989	Pierce	Good	Cross	1,250	1,000

Station: 14 Address: 8310 Sharaz Way

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 14	Engine	2010	Pierce	Good	3	1,500	1,000
Brush 14	Wildland	1996	Hummer	Good	Cross	125	200
Squad 14	Squad	2001	Chevy	Good	Cross	N/A	N/A
Marine 14	Boat	2007	Zodiac	Good	Cross	N/A	N/A
Reserve 97	Engine	1997	Ferrara	Good	Cross	1,250	1,000
Marine 14-1	Boat	2007	Jon	Good	Cross	N/A	N/A

Station: 16 Address: 7375 Market St

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 16	Engine	2007	Pierce	Good	3	1,500	1,000
Reserve 95	Engine	1995	Salisbury	Good	Cross	1,500	1,000
Wood Trailer	Trailer	N/A	N/A	Good	N/A	N/A	N/A
Fire Crew Trailer	Trailer	N/A	N/A	Good	N/A	N/A	N/A

Station: 17 Address: 5901 Murrayville Rd

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 17	Engine	2007	Pierce	Good	3	1,500	1,000
Truck 17	Ladder	2009	Pierce	Good	3	1,500	300
Battalion 3	Command	2010	Ford	Good	1	N/A	N/A
Engine 98	Engine	1992	KME	Good	Cross	1,500	1,000
Battalion 4	Command	2009	Ford	Good	Cross	N/A	N/A

Station: 18 Address: 5636 Carolina Beach Rd

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 18	Engine	2002	Pierce	Good	3	1,500	1,000
Rescue 18	Rescue	2002	Pierce	Good	3	N/A	N/A
Reserve 94	Engine	2000	Pierce	Good	Cross	1,250	1,250
Tender 18-1	Tender	2007	Freightliner	Good	Cross	750	2,100
Tender 18	Tender	2011	Pierce	Good	Cross	500	2,100

Station: 19 Address: 9815 River Rd

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 19	Engine	2007	Pierce	Good	3	1,500	1,000
Brush 19	Wildland	1995	Ford	Good	Cross	100	150
Truck 19	Ladder	1997	Sutphen	Good	Cross	1,500	300
Marine 19	Boat	1994	Northrup	Good	Cross	N/A	N/A
Tender 19	Tender	1996	Freightliner	Good	1	1,250	1,500
Marine 19-1	Boat	2007	Jon	Good	Cross	N/A	N/A

City of Wilmington Fire Department (WFD)

The following figures summarize the primary apparatus within the WFD fleet.

Station: Headquarters Address: 801 Market Street

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 1	Engine	2008	Sutphen	Very good	3	1500	500
Engine 31	Engine	1998	Sutphen	Good	3	1500	500
Truck 1	Quint	2006	Sutphen	Very good	3	2000	300
Battalion 1	SUV	2008	Ford	Good	1	N/A	N/A
Marine 3	18' Boat		Zodiac	Good	0	N/A	N/A
Dive Support Unit	Squad	1999	Hackney	Good	0	N/A	N/A
Brush 1	Pick up	1999	Ford	Good	0	250	200

Station: 2 Address: 3403 Park Ave

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 2	Quint	1999	Sutphen	Fair	3	1500	300
Rescue 2	Rescue	2013	Pierce	New	3	N/A	N/A
Tactical Rescue 1	Squad	2000	Hackney	Good	0	N/A	N/A

Station: 3 Address: 3933 Princess Place Drive

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 3	Engine	2006	Sutphen	Good	3	1500	500

Station: 4 Address: 310 Wallace Ave

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 4	Engine	2001	Sutphen	Good	3	1500	500

Station: 5 Address: 1502 Wellington Ave

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 5	Quint	2012	Sutphen	New	3	1750	500
Brush 5	Pickup	2001	Dodge	Good	0	250	200
Foam Unit 1	Trailer	2004		Good	0	N/A	600

Station: 6 Address: 3939 Carolina Beach Rd.

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 6	Engine	2000	Sutphen	Good	3	1500	750

Station: 7 Address: 3230 S. College Rd

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 7	Engine	1998	Sutphen	Good	3	1500	500
Truck 7	Quint	1997	Sutphen	Good	3	1500	300
Haz Mat 1 (RRT-2)	Tractor Trailer	1995	Freightliner	Good	0	N/A	N/A
Haz Mat support	Pick Up	2008	Ford	Very Good	0	N/A	N/A
Haz Mat Support	Pick up	1998	Chevy	Good	0	N/A	N/A

Station: 8 Address: 601 Eastwood Rd

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 8	Quint	2001	Sutphen	Good	3	1500	300
Safety 2	Pick up	2000	Ford	Fair	1	N/A	N/A

Station: 9 Address: 1201 Military Cut-off Rd

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 9	Engine	1999	Sutphen	Good	3	1500	500
Marine 4	Boat	2000?	Lowe	Good	0	N/A	N/A
Brush 9	Pick up	2001	Dodge	Good	0	N/A	N/A

Station: 10 Address: 6102 Oleander Dr.

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 10	Engine	2007	Sutphen	Very Good	3	1500	500
	Tractor						
Haz Mat 2	trailer	1989	Ford	Good	0	N/A	N/A
Battalion 2	SUV	2008	Ford	Good	1	N/A	N/A

Station: 15 Address: 3335 Masonboro Loop Rd

Apparatus Designation	Type	Year	Make / Model	Condition	Minimum Staffing	Pump Capacity	Tank Capacity
Engine 15	Engine	2001	Sutphen	Good	3	1500	500
Mobile Air 1	Air truck	1991	Hackney	Good	0	N/A	N/A
Brush 15	Pickup	1991	Chevy	Good	0	250	200

Capital Improvement Planning

Fire apparatus are typically very unique and expensive pieces of equipment, often very customized to operate efficiently in a narrowly defined mission. A pumper may be designed such that the compartments fit specific equipment and tools, with virtually every space on the truck designated in advance for functionality. This same vehicle, with its specialized design, cannot be expected to function in a completely different capacity, such as a hazardous materials unit or a rescue squad. For this reason, fire apparatus is very expensive and offers little flexibility in use and reassignment. As a result, communities across the country have sought to achieve the longest life span possible for these vehicles.

Unfortunately, no mechanical piece of equipment can be expected to last forever. As a vehicle ages, repairs tend to become more frequent, parts more difficult to obtain, and downtime for repair increases. Given the emergency mission that is so critical to the community, this factor of downtime is one of the most frequently identified reasons for apparatus replacement.

Because of the large expense of fire apparatus, most communities have efforts in place to plan ahead for the cost of replacement. To properly do so, communities often turn to the long-accepted practice of establishing a life cycle for the apparatus that result in a replacement date being anticipated well in advance. Many communities then set aside incremental funds during the life of the vehicle so replacement dollars are ready when needed.

When considering joining multiple agencies into a single entity, it is important to evaluate the future costs that can be anticipated for the replacement of major capital assets. The most expensive capital items that make up a fire department are facilities (fire stations) and major apparatus, including fire engines and aerial ladder trucks.

ESCI reviewed capital replacement planning methods in the participating agencies. Different approaches are employed, ranging from well planned and appropriately funded replacement schedules to simply meeting capital needs on an as-needed basis. The findings are summarized in the following figure.

Figure 17: Capital Replacement Planning Summary

Agency	Apparatus Replacement Plan	Facility Replacement Plan	Funding Method
NHCFR	Formal apparatus replacement plan in place on a six year rolling cycle	Formal facility replacement, renovation, addition plan in place	Part of the special district budget and dependent upon available funding. Typically funded through bonds or installment financing.
WFD	Formal apparatus replacement plan in place on a variable cycle – 15 years for engines, 20 years for aerial apparatus and 15 years for rescues	Formal facility replacement, renovation, addition plan in place	Part of the general fund budget and dependent upon available funding. Typically funded through bonds or installment financing

Section Observations:

Below are recommendations contained within the previous agency evaluations that have not been implemented and are still recommended for consideration by the respective department.

New Hanover County 1998 Feasibility Study

- Ogden Station
 - Consider the installation of a fire suppression system.
 - Develop energy conservation measures.

New Hanover County 2009 Feasibility Study

- Ogden Station
 - Should be considered for replacement.

City of Wilmington 2006 Fire Department Assessment

- All recommendations have been addressed. Some current stations are currently being replaced.

STAFFING AND PERSONNEL MANAGEMENT

In career emergency services organizations, personnel represent the single greatest expenditure within a department's budget. NHCFR and WFD are no different. As discussed previously, personnel accounted for a large percentage of each department's overall budget. Without proper levels of personnel, apparatus, and stations will sit idle and may not be readily available for emergency response. This section is intended to provide the reader with a review of each agency's personnel management practices as compared to industry best practices and to examine the department's ability to provide sufficient staffing resources for the risks that exist within throughout the community.

Administrative and Support Staffing

The primary responsibility of a department's administration and support staff is to ensure that the organization's operational entities have the abilities and means to fulfill their mission at an emergency incident. Efficient and effective administration and support are critical to the department's success. Without adequate oversight, planning, documentation, and training the operational capabilities of the department may suffer and ultimately fail operational testing. Administration and support require appropriate resources to function effectively.

Analyzing the ratio of administration and support positions to the total departmental positions facilitates an understanding of the relative number of resources committed to this function. The appropriate balance of administration and support positions to the operational component is critical to the department's ability to fulfill its mission and responsibilities. Although no formal studies have been conducted to identify the optimum personnel mix, it has been ESCI's experience that the typical ratio of administrative and support staff to total personnel in career departments fall within the 10 to 15 percent range. The following figure illustrates the departments' administrative and support complement.

Figure 18: Summary of Administrative and Support Personnel

Position	NHCFR	WFD	Total
Fire Chief	1	1	2
Assistant Chief	0	2	2
Deputy Chief	3	0	3
Battalion Chief	1	5	6
Deputy Fire Marshal	3	0	3
Captain	3	5	8
Firefighter/Master FF	0	4	4
Educator	.5	1.5	2
Garage Supervisor	0	1	1
Mechanic	0	2	2
Hydrant Tech.	1.5	0	1.5
Logistics Staff	0	1	1
Analyst	1	2	3
Clerical	2	4.5	6.5
Total	16	29	45

Based on the total number of personnel compared to the total number of administrative and support personnel, NHCFR has an admin/support to total personnel ratio of 9.7 percent compared to WFD's ratio of 15.1 percent.

Operational Staffing

It takes an adequate and well-trained staff of emergency responders to put the appropriate emergency apparatus and equipment to its best use in mitigating incidents. Insufficient staffing at an operational scene decreases the effectiveness of the response and increases the risk of injury to all individuals involved. The following figure summarizes the operational personnel of the study departments.

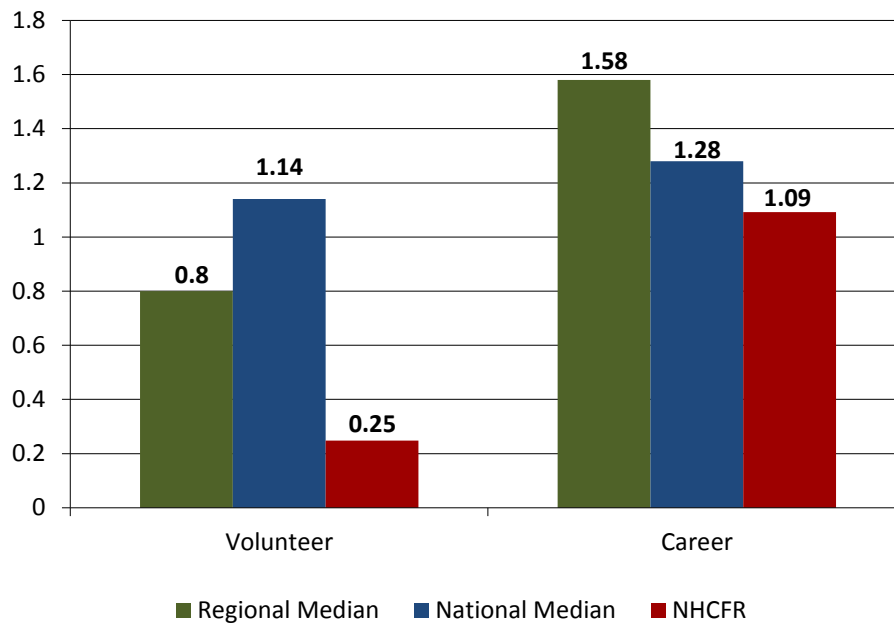
Figure 19: Summary of Operational Personnel

Position	NHCFR	WFD	Total
Battalion Chief	3	6	9
Captain	30	48	78
Apparatus Operator/Engineer	51	0	51
Master Firefighter	0	45	45
Firefighter	18	90	108
Total Career	102	189	291

NHCFR also uses 37 part-time personnel to fill vacancies created by the usage of benefit leave time and other unscheduled absences. In addition, 22 volunteer personnel have been retained from the previous multi-departmental model. Both of these categories, while beneficial to the organization, have seen sharp declines in availability and participation over the last six months to a year.

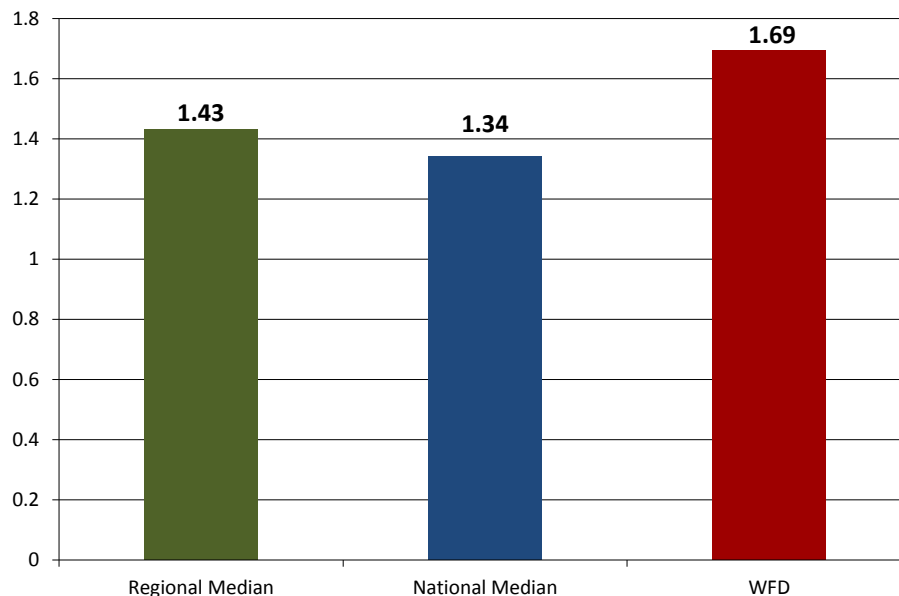
While it is beneficial to view each department from a gross staffing perspective, it is also useful to compare each agency against regional and national benchmarks. The following figure compares NHCFR's career and volunteer staffing with those medians.

Figure 20: Comparison of Firefighters per 1,000 Population – NHCFR



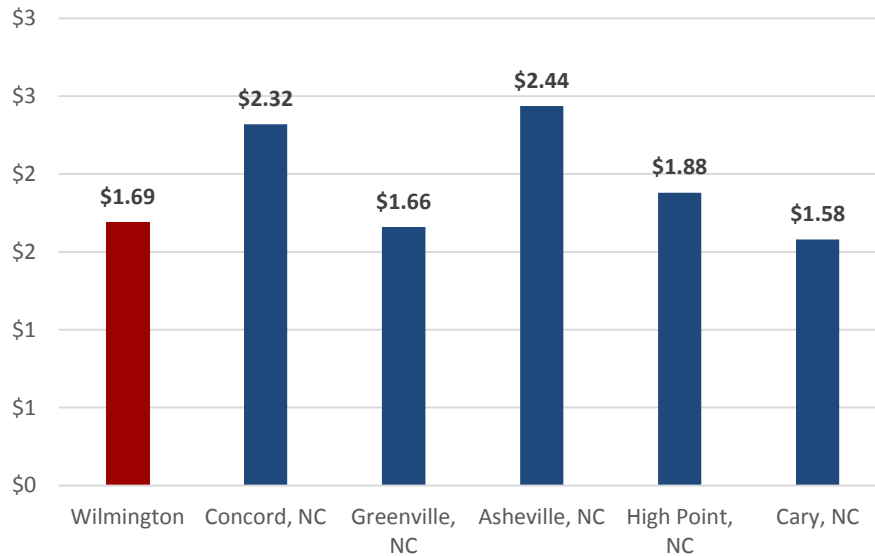
Based on the benchmark data, NHCFR falls below the regional and national medians for both volunteer and career firefighters per 1,000 population. This is not to say that the department is understaffed. The available benchmark data does not take into account the availability of part-time personnel and does not differentiate between those departments that do or do not provide transport emergency medical services. The following figure gives the same comparison for WFD.

Figure 21: Comparison of Firefighter per 1,000 Population – WFD



Based on the benchmark data, WFD has a slightly higher rate of career operational personnel than the regional and national medians but the difference is nominal. The figure below compare WFD to the five most similarly population cities in N.C. as discussed in the introduction of this report; cities that contain between 100,000 and 249,000 residents.

Figure 22: Comparison of Firefighters per 1,000 Population (NC Benchmark)



Based on comparably populated cities in N.C., WFD ranks as the third lowest in career personnel per 1,000 population.

Staffing Coverage and Performance

As presented above, the raw numbers of personnel within each study department vary as do the positions. How those personnel are distributed throughout the jurisdiction can be an indicator of how well the department can produce its own personnel for emergency incidents. NHCFR maintains a full and minimum staffing level of 34 personnel at all times. For WFD, the normal minimum staffing level is 48 personnel. The following figure summarizes how each department distributes available staff across their fixed facilities.

Figure 23: Staff Allocation

Station	Assigned	Minimum
NHCFR		
Station 11	5	5
Station 12	3	3
Station 13	3	3
Station 14	3	3
Station 16	3	3
Station 17	7	7
Station 18	6	6
Station 19	4	4
Total	34	34
WFD		
Headquarters	13	10
Station 2	8	6
Station 3	4	3
Station 4	4	3
Station 5	4	3
Station 6	4	3
Station 7	8	6
Station 8	5	4
Station 9	4	3
Station 10	5	4
Station 15	4	3
Total	63	48

As indicated above, NHCFR uses a staffing model that does not differentiate between minimum staffing levels and assigned staffing levels. With this staffing model, vacancies are filled by limited part-time employees or full-time employees in an overtime status. After further discussion, it was discovered that NHCFR had requested and was approved in FY 2015's budget to add two positions per shift to help accommodate vacancies, leave and training when staff may not be in position for response. While this is a step in the right direction, additional considerations may be needed to help staffing vacancies in the future.

Each station houses an engine as the primary response vehicle but most also house additional apparatus that can be used based on the specific incident type. For example, if the dispatched incident is wildland in nature, brush vehicles or tenders may respond rather than the primary engine. Similarly, if the incident is in a rural area, a tender may respond in addition to the primary apparatus or in place of an aerial ladder. Staffing will vary for these specific apparatus on how many personnel are available and the type of incident dispatched. NHCFR should consider additional staffing to certain stations in which tender are assigned. As indicated earlier in this section, the tenders are cross-staffed with crews that are assigned to rescue or engine companies. In essence, when fires are dispatched in areas lacking fire hydrants, some primary apparatus may be removed from service to ensure that tenders are able to respond in a timely manner. While staffing each tender may not be practical, consideration should be

given to staff strategic tender locations. This concern is supported in the Fiscal Considerations Section of this report in the Example Apparatus Deployment and Staffing Model.

WFD is a completely career fire department and relies on full-time personnel on call-back status to fill vacant positions when staffing reaches a certain level. NHCFR is predominantly career but also uses a cadre of part-time and volunteer staff to complement the career staff and to provide greater response performance to some areas. The following figure summarizes some of the scheduling elements that ESCI evaluated as a part of this project.

Figure 24: Summary of Staffing Coverage and Performance Elements

	NHCFR	WFD
Career Workweek	56-hour	56-hour
Paid Operations Personnel Schedule		
Schedule Rotation	9-day rotation	9-day rotation
Shift Starts	7:00 a.m.	7:30 a.m.
Employee Call-Back Requirements	Yes	Yes
Employee Residency Requirements	90 minutes	None

In most communities around the country, the number of fire calls has declined over the past decade. Yet as the frequency of fires diminishes, in part due to stricter fire codes and safety education, the workload of fire departments has risen sharply — medical calls, hazardous materials calls, and every sort of household emergency are now addressed by fire departments. Therefore, as the frequency of fires diminishes, the need for a ready group of firefighters has increased.

Although modern codes tend to make fires in newer structures more infrequent, today's energy-efficient construction (designed to hold heat during the winter) also tends to confine the heat of a hostile fire. In addition, research has shown that modern furnishings generally burn hotter due to synthetics and roofs collapse sooner because prefabricated roof trusses separate easily after a very short exposure to flame. In the 1970s, scientists at the National Institute of Standards and Technology found that after a fire broke out, building occupants had about 17 minutes to escape before being overcome by heat and smoke. Today, that estimate is three minutes.⁴ It is now more critical than ever for firefighters to arrive on scene urgently and efficiently.

ESCI is providing analysis of incident staffing performance for each department in two ways. Initially, the report will provide a glimpse of how well the departments are doing at producing their own workforce for incidents within their primary service areas. ESCI believes this data is important and can be an indicator for the individual departments as to the effectiveness of its own staffing efforts.

ESCI also recognizes that for all but the smallest, low-risk incidents, fire departments are typically acting together in providing fire protection through a coordinated regional response of mutual and automatic aid. This is particularly true for structure fires and other high-risk incidents where staffing needs are

⁴ National Institute of Standards and Technology, *Performance of Home Smoke Alarms, Analysis of the Response of Several Available Technologies in Residential Fire Settings*, Bukowski, Richard, et al.

high. ESCI believes that this data is equally important and can be an indicator of the department's level of success the department is achieving in providing adequate staffing to meet the needs of higher-risk incidents.

Of significance to the staffing objective of this study, *NFPA 1710* establishes that a response company consists of four personnel. The standard does not require that all four be on the same vehicle, but does expect that the four will operate as a single functioning unit once on scene. The *NFPA 1710* response time standard also requires that all four personnel be on scene within the recommended response time guidelines.

There is another reason the arrival of four personnel is critical for structure fires. OSHA regulations require that before personnel can enter a building to extinguish a fire, at least two personnel *must* be on scene and assigned to conduct search and rescue in case the fire attack crew becomes trapped. This is referred to as the two-in, two-out rule.⁵ There are, however, some exceptions to this regulation. If it is *known* that victims are trapped inside the building, a rescue attempt can be performed without additional personnel ready to intervene outside the structure. The following figure illustrates, on average, how many personnel responded to working structure fires within the primary jurisdictions of the study departments over the past several years.

Figure 25: Average Structure Fire Staffing Performance History

	NHCFR	WFD
2011-2013 Average	14.3	19.3

While the values in the figure above represent actual numbers of personnel (average) assigned to the incident, it does not indicate how long it took to assemble those personnel or if all personnel were on the scene. The information contained in the figure above was obtained by reviewing each department's National Fire Incident Reporting System (NFIRS) records. Based on an analysis of both agencies' data, sufficient personnel are typically generated to combat and effectively mitigate a moderate risk structure fire.

Human Resources Policies and Handbooks

It is important that members of the organization know to whom they should go when they have a problem, question, or issue related to their relationship to the department. In large companies, this function is typically handled by a human resource department. Staff within such a department handles questions, issues, and tasks related to appointment, benefits, performance, disciplines, promotion, or termination.

Both study departments have comprehensive human resources documents both at the government and department level. Job descriptions are complete and up-to-date for each position with the respective departments and neither agency has collective bargaining in place since it is statutorily prohibited for public employees. Personnel within WFD have the added protections of civil service, which guarantee

⁵ 29 CFR 1910.134(g)(4).

certain aspects of due process for hiring, disciplinary actions and termination. The following figure summarizes the human resources elements.

Figure 26: Summary of Human Resources Policies and Handbooks Elements

	NHCFR	WFD
Quality of Job Descriptions	Complete, thorough and up-to-date	Complete, thorough and up-to-date
Collective Bargaining	No	No
Civil Service	No	Yes

Compensation Systems and Rank Structures

In order for a department to recruit and retain quality personnel, compensation and benefits (as well as overall working conditions) must be competitive of surrounding organizations. Each organization applies various compensation and benefit packages to the respective departments. The following figure summarizes the compensation and benefits elements of the study agencies.

Figure 27: Summary of Compensation and Benefits Elements

	NHCFR	WFD
Retirement Plan	State plan used	State plan used
Medical Insurance (not duty related)	Employer/Employee shared	Employer/Employee shared
Dental Insurance (not duty related)	Employer/Employee shared	Employee paid
Vision Insurance (not duty related)	Employee paid	Employee paid
Critical Incident Stress Debriefing (CISD) Program	County team	County team
Employee Assistance Program (not duty related)	Yes	Yes
FF Pay Range	\$31,479.00 - \$48,235.00	\$31,842.72 - \$44,614.00
FF/Apparatus Operator Pay Range	\$38,008.00 - \$64,614.00	N/A
Master FF Pay Range	N/A	\$38,986.92 - \$60,069.60
Captain Pay Range	\$46,198.00 - \$78,537	\$48,172.32 - \$72,258.00
BC Pay Range	\$58,962.00 - \$100,235	\$58,968.00 - \$88,452.00
AC Pay Range	N/A	\$72,384.00 - \$108,576.00
Education Incentive	No	No
EMS Incentive	No	No
Holiday Time	144 hours	88 hours (40-hour emp.) 124 hours (shift emp.)
Vacation Time	8.57-20.6 hours monthly	9.38-19.69 hours monthly
Sick Time	10.31 hours monthly	8 hours monthly (40-hour emp.) 11.25 monthly (shift emp.)

Although significant differences exist between the base compensation levels of the study agencies, a recently completed compensation study conducted by New Hanover County is expected to implemented mid-2014 that will close the salary and benefit gaps between the two fire departments.

Disciplinary Processes

A formal progressive disciplinary process for employees should be clearly identified and available. The process should provide various levels of discipline focused on correcting unacceptable behaviors with

the most reasonable actions considered appropriate and effective. The process under which discipline is applied should be clear and unambiguous. A multi-level appeals process must be documented to afford the employee who feels aggrieved by an unreasonable disciplinary action the opportunity to have his/her issues reviewed by an impartial party.

The following figure summarizes the disciplinary process elements.

Figure 28: Summary of Disciplinary Processes Elements

	NHCFR	WFD
Disciplinary Policy	Formal written policy in place	Formal written policy in place
Disciplinary Appeals Process	Formal written process in administrative policy documents	Formal written process in administrative policy documents

Application and Recruitment Programs

Successful emergency services agencies strive to ensure that their recruitment efforts are focused on the specific demographics of the population served combined with streamlined applications processes and formalized retention programs. The following figure summarizes the application and recruitment elements.

Figure 29: Summary of Application and Recruitment Program Elements

	NHCFR	WFD
Minimum Physical Standards Established	Yes	Yes
Aptitude of Knowledge Testing	Yes	Yes
Pre-Appointment Medical Exam Required	Yes	Yes
Pre-Appointment Medical Exam Paid	Paid by agency	Paid by agency
Nature of Pre-Appointment Medical Exam	Exam is fully NFPA 1582 compliant	Exam is fully NFPA 1582 compliant
Who is the Hiring Authority	Fire Chief	Fire Chief
Applicant Process Includes	Complete application packet with job description and requirements	Complete application packet with job description and requirements

As evident from the previous figure, application and recruitment programs between the study agencies are identical.

Testing, Measurement, and Promotional Processes

Once achieving active employment, individuals should be evaluated periodically to ensure their continued ability to perform their duties safely and efficiently. Technical and manipulative skills should be evaluated on a regular basis. This provides documentation about an employee's ability to perform their responsibilities and provides valuable input into the training and education development process.

Regular evaluation and feedback for personnel is critical to behavior modification and improvement. It has long been proven that employees sincerely wish to perform well and to be a contributing part of any organization. This desire to succeed is best cultivated through effective feedback that allows an employee to know whether they are doing well or what needs improvement. The honest and effective presentation of this feedback encourages the member to reinforce those talents and abilities they already excel in and to work harder to improve the areas where they fail to perform as desired. The following figure summarizes the testing, measurement, and promotional process elements.

Figure 30: Summary of Testing, Measurement and Promotional Processes Elements

	NHCFR	WFD
Periodic Capability Testing to Measure Minimum Standards Compliance	JPPAT and JPR	Annual job related physical assessment, special team proficiency assessment
Periodic Performance Evaluations	Career personnel only	Yes
Frequency of Performance Evaluations	Annual with mid-year review	Annual with mid-year review
Formal Promotional Testing	Yes	Yes
Types of Promotional Testing	Full assessment center	Full Assessment Center

Health and Wellness Programs

Physical capacity testing cannot detect all potential limiting conditions of an individual's health and fitness levels. A periodic medical evaluation is necessary. National safety standards for firefighters recommend annual medical evaluations and bi-annual physical examinations. The examinations should include all the criteria included in the entry-level exam, as well as periodic stress EKGs for persons over 45 and regular blood toxicology screening. Communicable disease vaccinations can also be updated as needed during this process. The NFPA standard on medical requirements for firefighters (*NFPA 1582*), or equivalent, should be used as a resource for establishing the criteria of both entry-level and on-going medical evaluations for operational personnel. The following figure summarizes the health, wellness, and counseling elements of the study departments.

Figure 31: Summary of Health and Wellness Programs Elements

	NHCFR	WFD
Post-appointment Periodic Medical Examinations	Yes, annual	Yes, annual
Nature of Periodic Medical Exam	Exam is fully NFPA 1582 compliant	Exam is fully NFPA 1582 compliant

Section Observations:

Below are recommendations contained within the previous agency evaluations that have not been implemented and are still recommended for consideration by the respective department.

New Hanover County 1998 Feasibility Study

- All recommendations have been implemented.

New Hanover County 2009 Feasibility Study

- All recommendations have been implemented.

City of Wilmington 2006 Fire Department Assessment

- Consider publishing standard operating procedures in a pocket field guide for easier reference by operations personnel and for enhanced use in training drills and exercises.
- Consider establishing a citizens' advisory committee to provide community input to the Fire Chief and department senior staff.

SERVICE DELIVERY AND PERFORMANCE

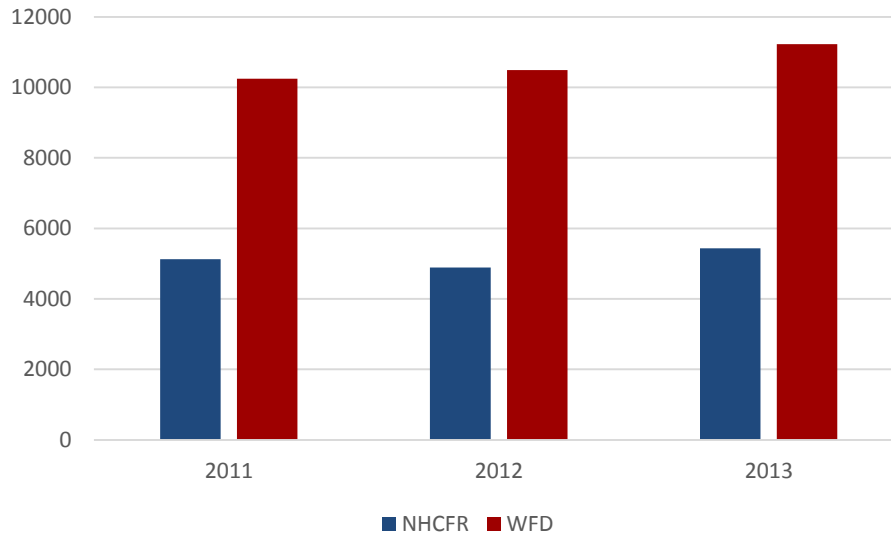
The previous sections of this report provided the reader with general information about how the study departments are organized and managed from a non-operational perspective. It is, however, the primary responsibility of an emergency services provider to deliver operational services to the community served. This section of the report evaluates the department's operational service delivery and performance regarding service demand, distribution of resources, concentration capabilities, unit reliability, and overall response performance.

Demand

Service demand can be defined in a number of ways depending on the types of services provided by the organization. For the purposes of this report, service demand is defined as any and all incidents where emergency resources are utilized to resolve the situation. These may include non-emergency incidents where resources are simply provided in a support role as well, but the primary goal is to show how busy the department is over a given period of time.

Analysis of service demand begins with a look at how busy each department is over a given period while attempting to determine if trends exist that can lead to increased efficiencies within each department individually and as a system. The following figure illustrates the overall service demand for the study agencies over the past three years.

Figure 32: Historical Service Demand



Over the three year period, NHCFR has increased 6.0 percent while WFD increased approximately 9.6 percent. This trend is expected to continue. The following figure breaks down the aggregate service demand into three primary categories; fire, emergency medical services, and other incidents such as service calls, alarms, and public assists.

Figure 33: NHCFR Service Demand by Type

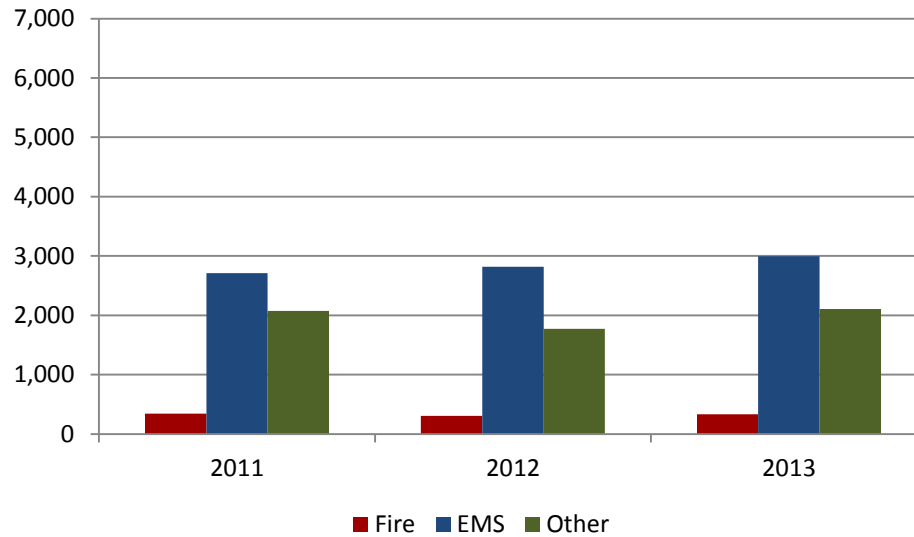
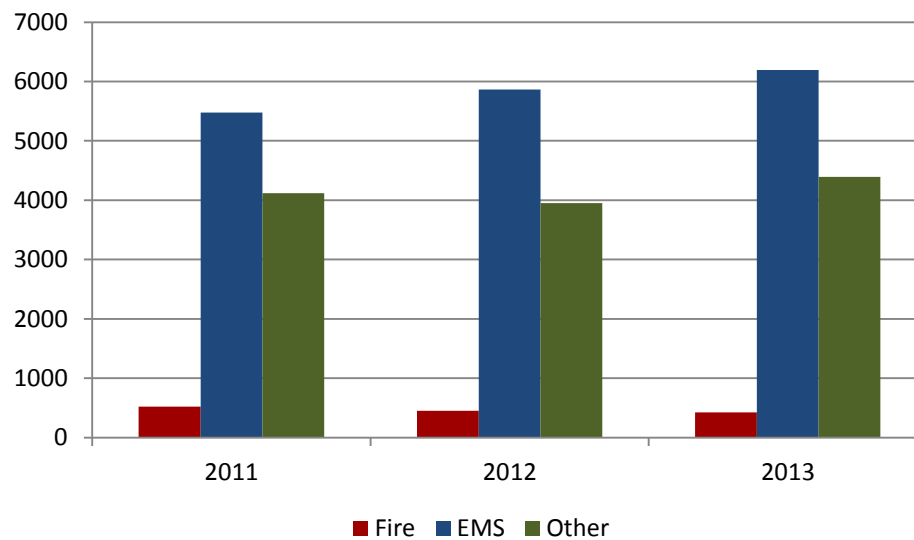


Figure 34: WFD Service Demand by Type



As can be seen from the previous figures, a majority of both agencies' service demand over the past three years is medical responses. This is common for departments that are active participants within their local emergency medical services system. Aside from reviewing service demand as an aggregate or by type, it is also useful to see it temporally. The following figures evaluate service demand for each agency by month.

Figure 35: NHCFR Service Demand by Month

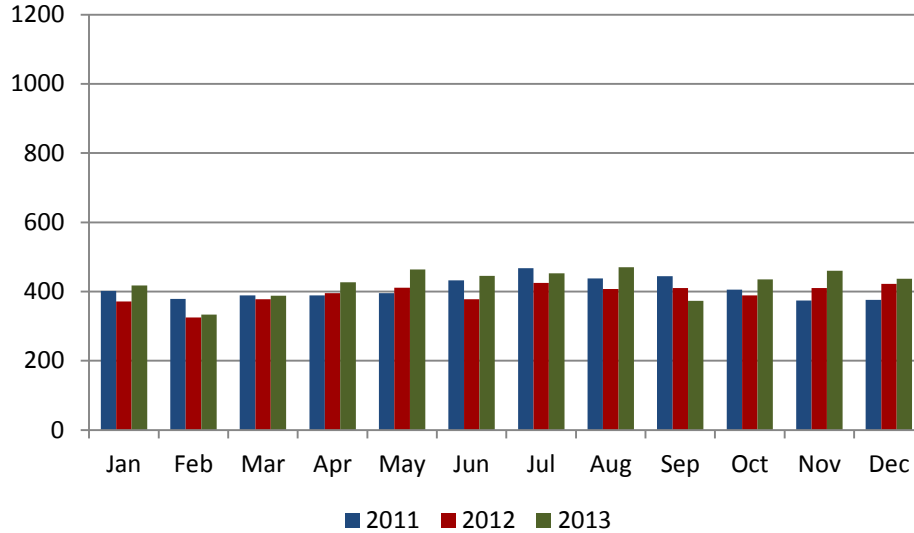
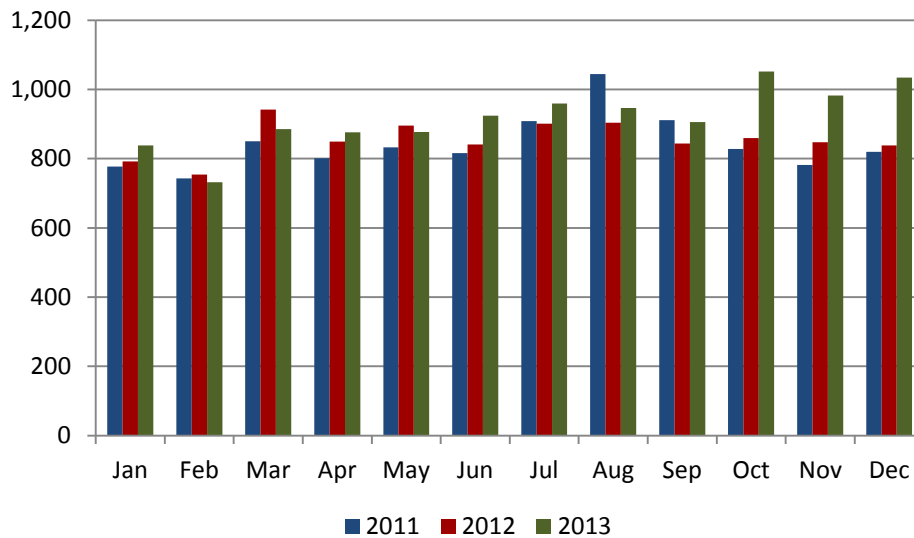


Figure 36: WFD Service Demand by Month



Both departments see generally increased service demand during the summer months as the populations within both communities rise due to vacationers at the beaches. Interestingly, however, the fall and winter months (October, November, and December) of 2013 saw a large spike in volume for both agencies. The next analysis evaluates service demand by day of week.

Figure 37: NHCFR Service Demand by Day of Week

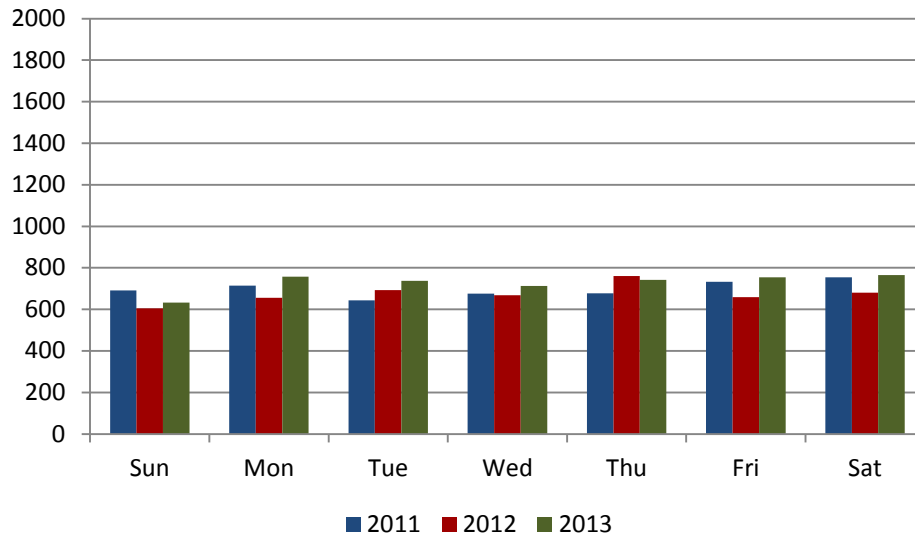
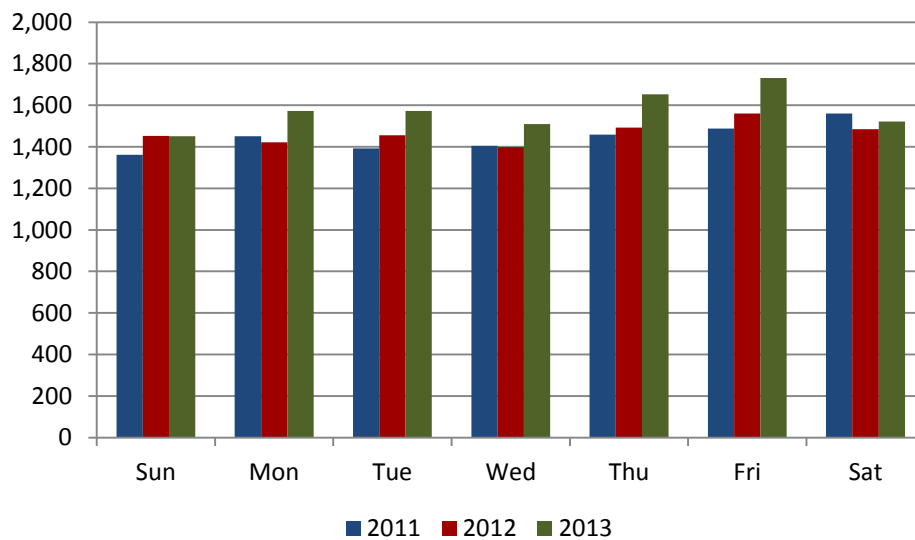


Figure 38: WFD Service Demand by Day of Week



Service demand based on day of week is variable across all days with little in the way of a trend. The final temporal analysis reviews service demand by hour of day.

Figure 39: NHCFR Service Demand by Hour of Day

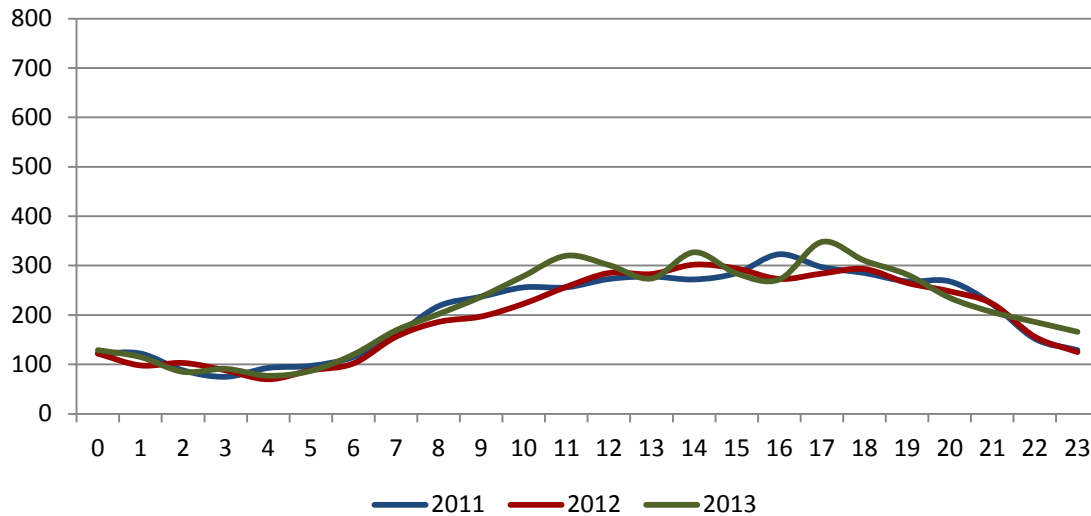
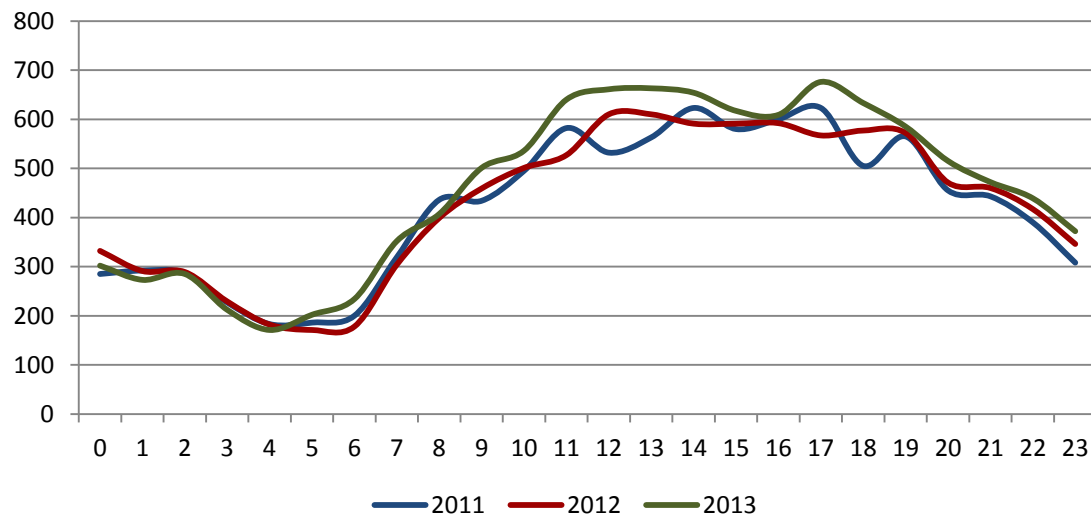
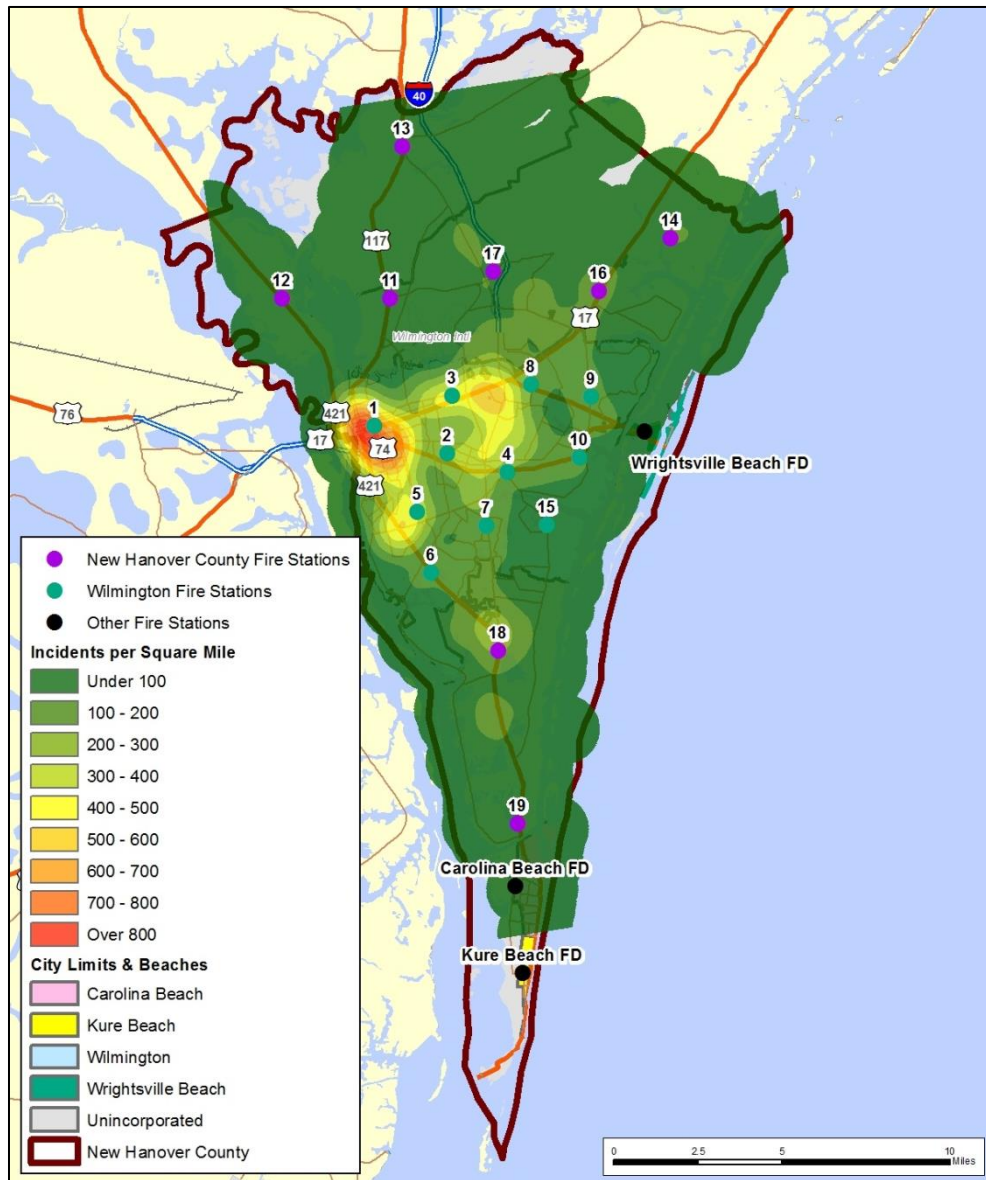


Figure 40: WFD Service Demand by Hour of Day



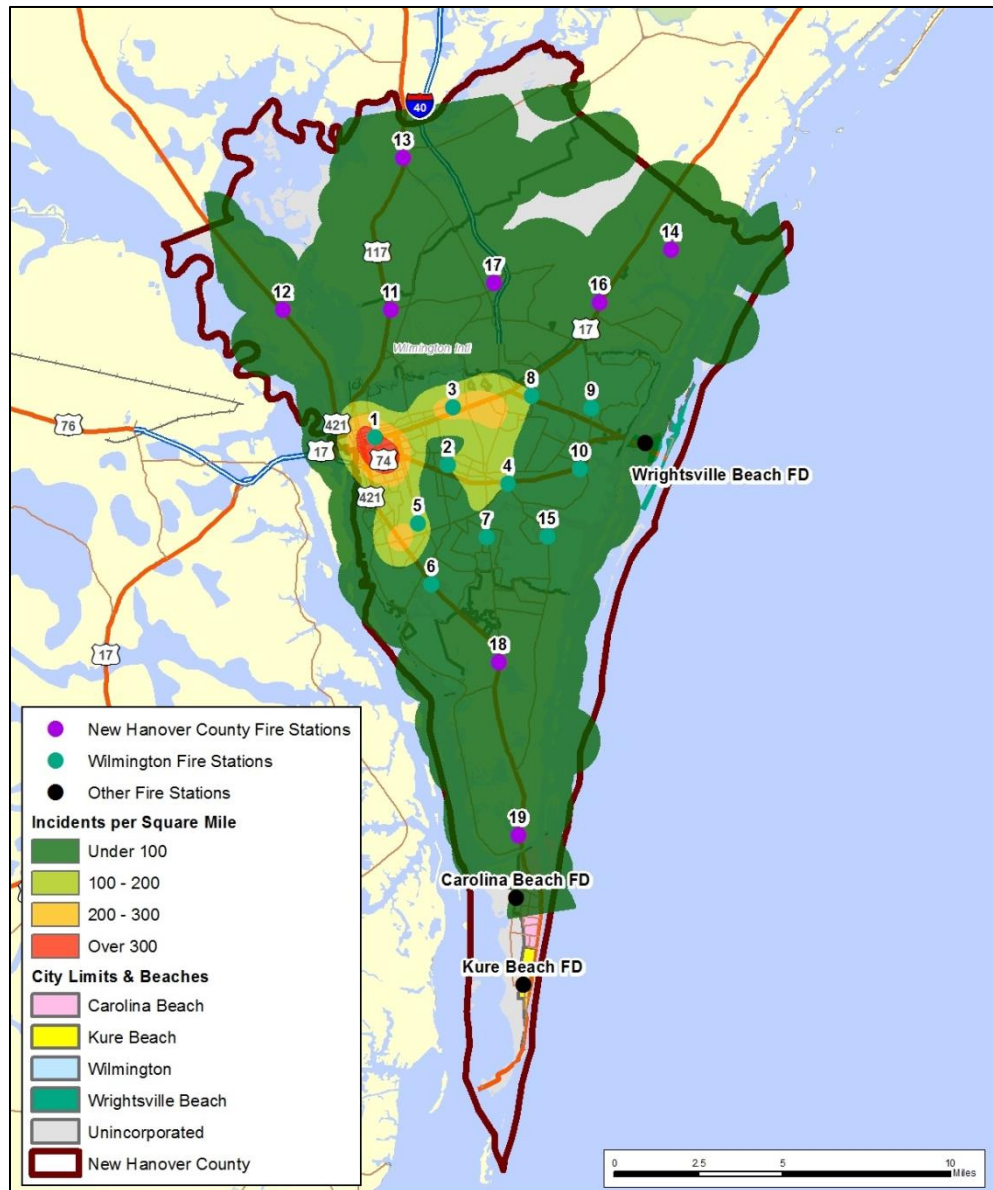
Both agencies see service demand begin to increase between 6:00 a.m. and 7:00 a.m., peaking during the midday hours and then declining into the evening. This is a typically bell curve pattern of hourly service demand, particularly for medical incidents, that follows general human activity. Understanding when service demand is occurring is vital so that resources can be scheduled accordingly. Where, however, that service demand is occurring is equally important so that resources can be deployed sufficiently to provide a quick response to a majority of the incidents. The following figure illustrates where the historic service demand is occurring and is read much like a weather map with high intensity colors representing areas of higher service demand.

Figure 41: Study Area Service Demand Density – All Incidents (2013)



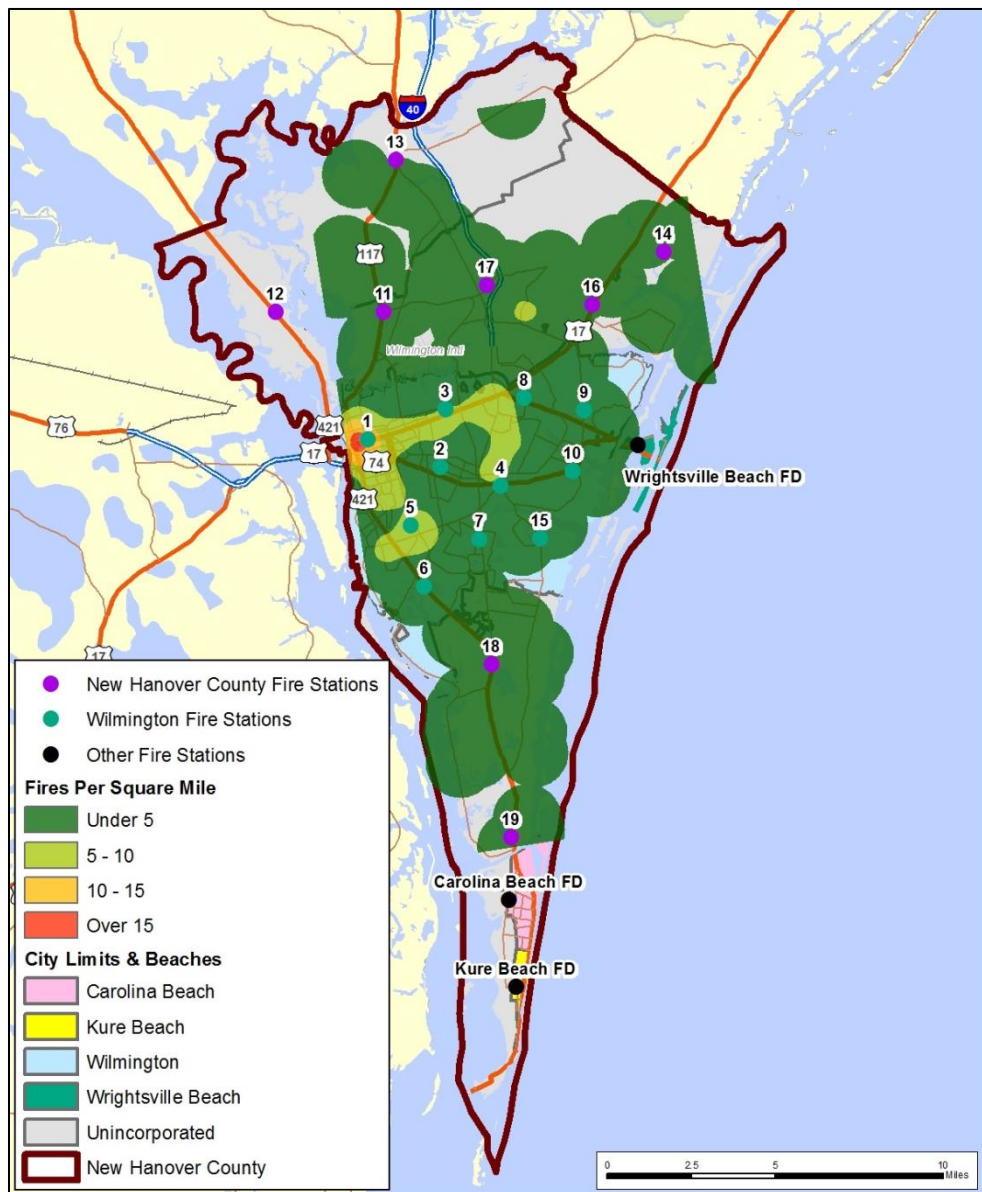
While nearly the entire county is covered with low service demand volume, the areas within the core of the City of Wilmington have a much higher density of service demand. The next figure focuses on medical responses geographically since those incidents comprise a majority of each agency's demand.

Figure 42: Study Area Service Demand Density – Medical Incidents (2013)



As expected, medical service demand (the most prevalent incident within both agencies) is also centered in the core of the city with decreasing demand moving toward the county boundaries. Although medical incidents are plentiful, the core mission of the departments is to provide fire suppression services. The following figure illustrates where structure fires have occurred over the data period evaluated.

Figure 43: Study Area Service Demand – Structure Fires (2013)



Unlike medical incidents that are tied to human activity, structure fires occur in a much more widespread area. Fire risk within a given community is static therefore resources must be deployed in a manner that will protect the greatest amount of property. This will be discussed more in the next section of this report.

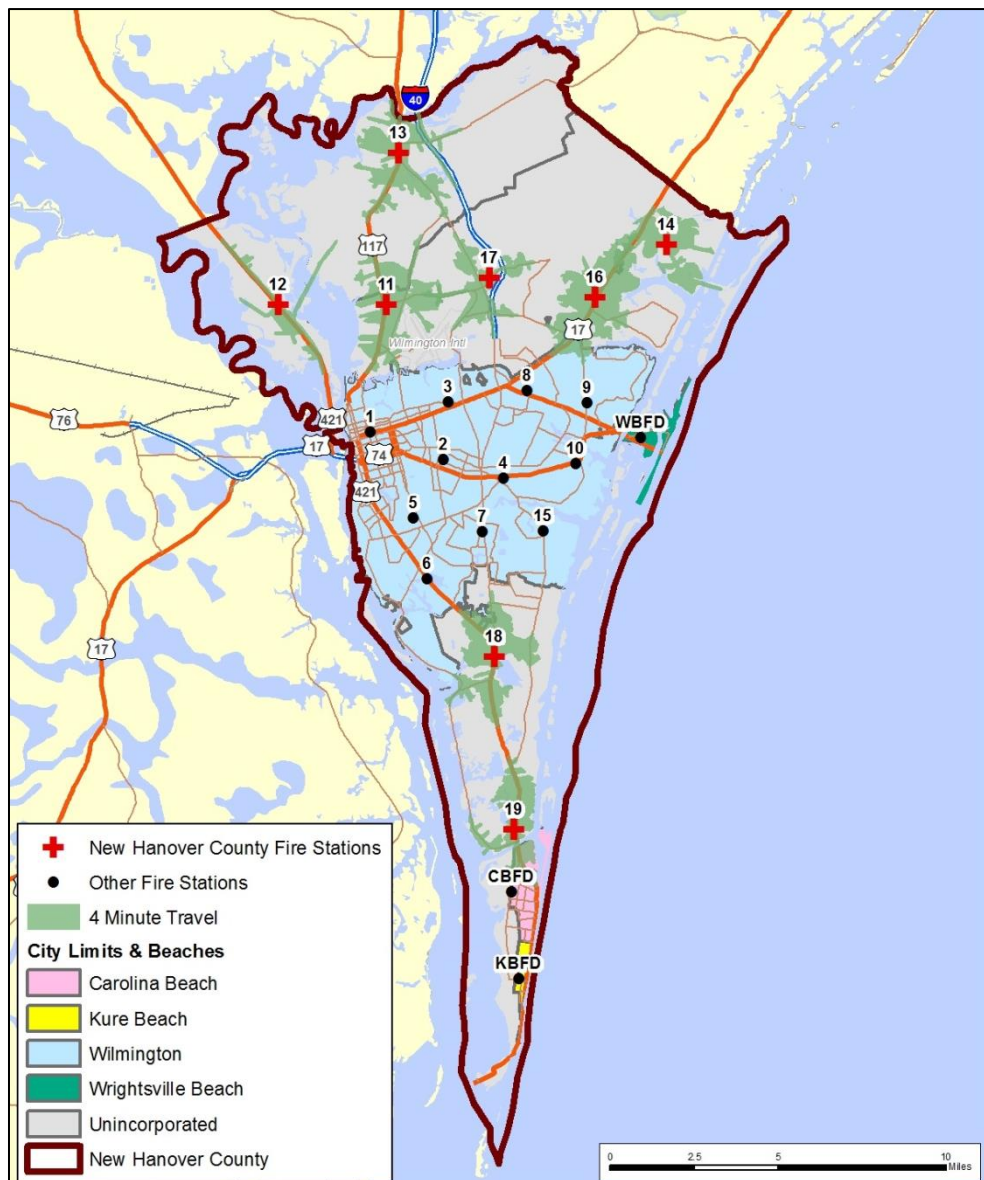
Distribution

Distribution analysis is an evaluation of how well physical resources (facilities) are deployed across a specific geographic area. For medical incidents there is little in the way of guidance on how well resources should be distributed because these incidents are primarily driven by human activity. For fire protection, however, there are several industry standards that specify how fire stations should be distributed. The National Fire Protection Association (NFPA) recommends that fire departments serving

urban areas with career personnel be able to respond to 90 percent of emergency incidents within 5:00 to 5:20 of total response time (one minute for turnout for medical responses and 1:20 (80 seconds) for fire responses and four minutes for travel). For combination fire departments, NFPA provides a tiered response performance objective that recommends urban environments meet a response performance within nine minutes of total response time (turnout and travel combined), 10 minutes in a suburban environment and 14 minutes in a rural environment.

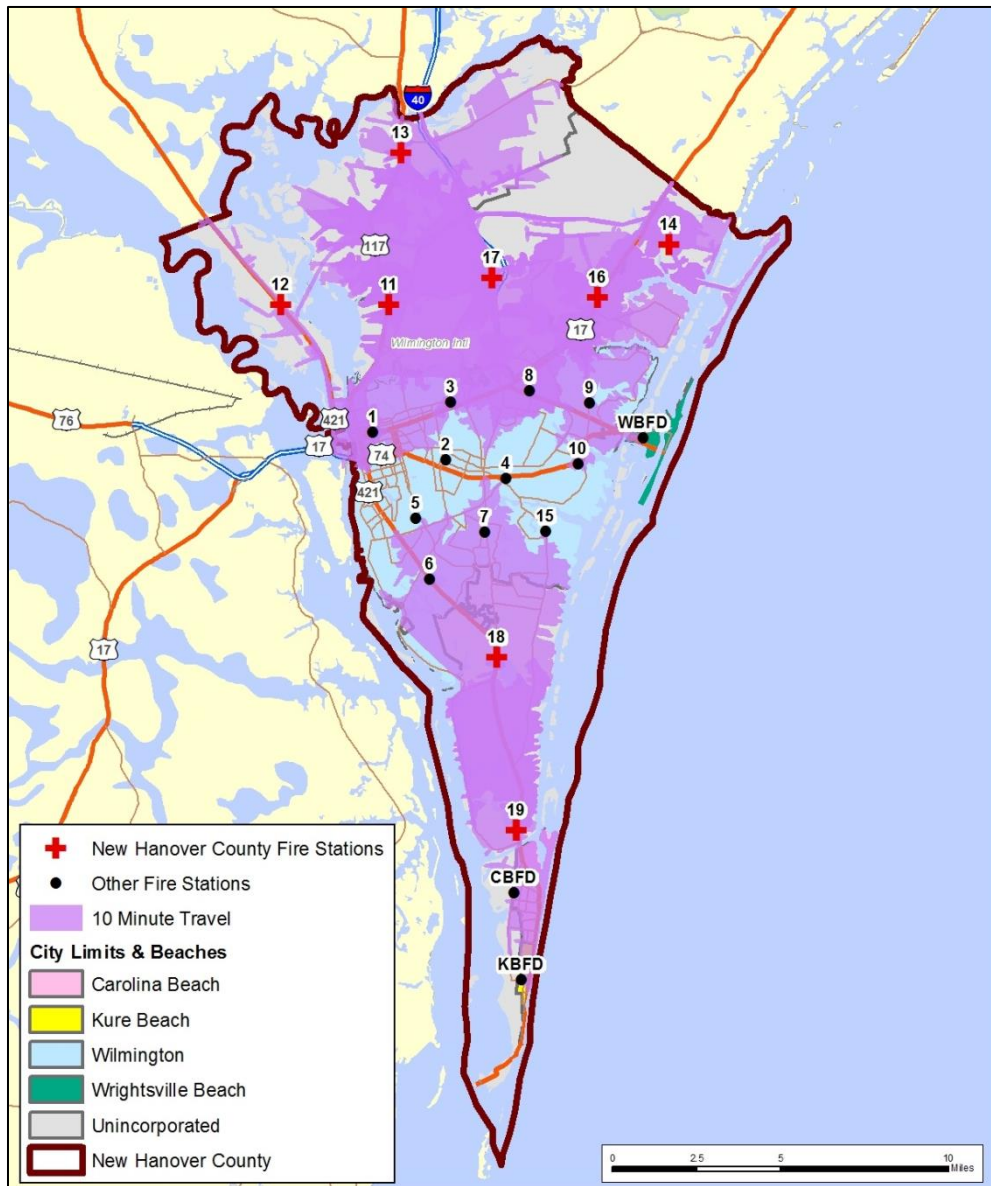
The following figure illustrates four-, 10- and 14-minute travel models from existing NHCFR stations and does not take into account station staffing or the potential for concurrent incidents.

Figure 44: NHCFR Four-Minute Travel Model



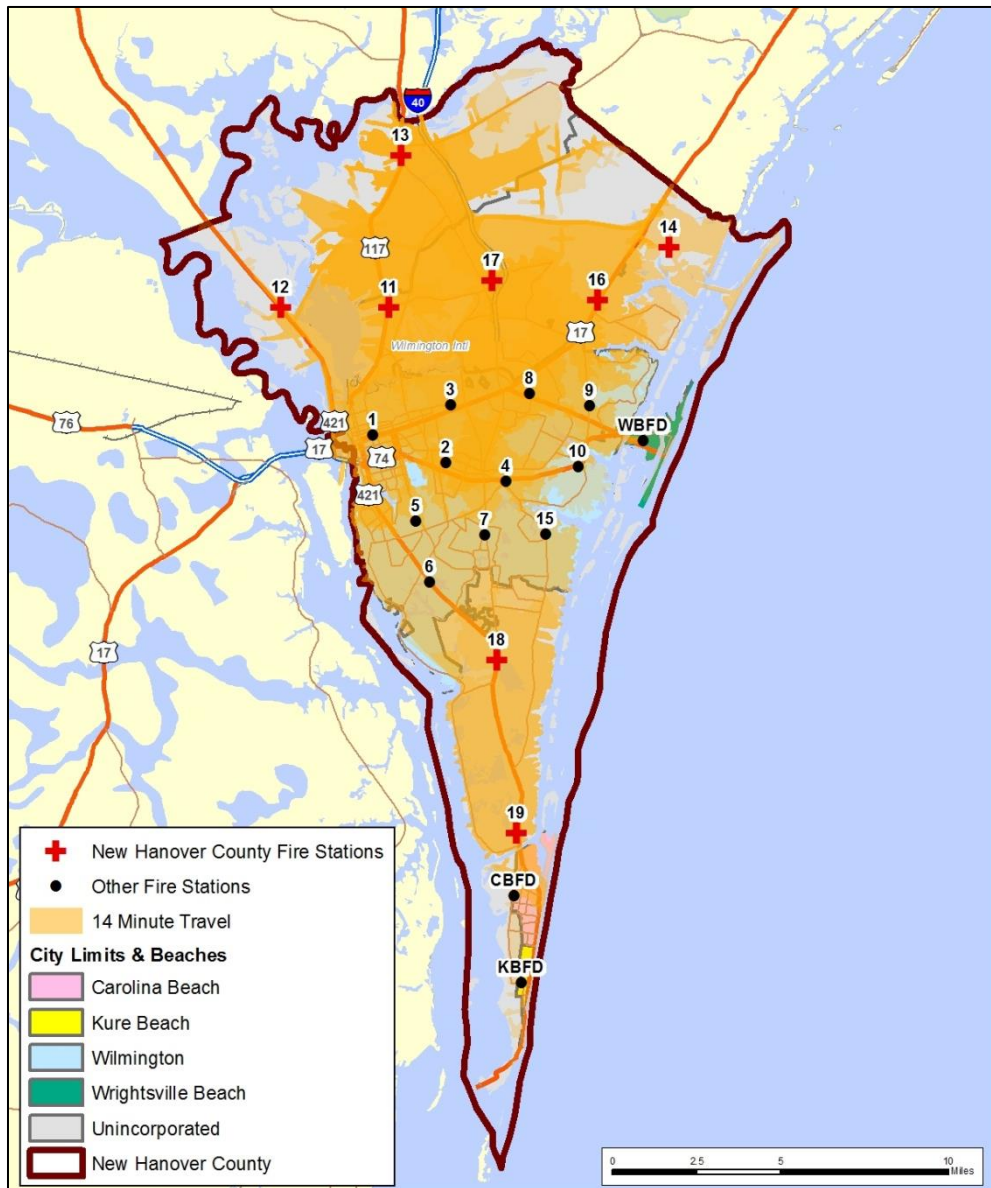
This model indicates that a small land area of unincorporated New Hanover County can be reached within four minutes of travel. As stated previously, NFPA has a tiered response performance objective for combination fire departments. NHCFR is identified as a combination fire department due to the inclusion of volunteer members, however, the composition of membership has closely aligned them to fall into consideration of NFPA 1710 (career departments). The appendix of NFPA 1710 (A.4.1.2) identifies that jurisdictions may adjust levels of service based on different criteria such as natural barriers, insufficient water supply, population, etc. Due to the dense population of certain areas of unincorporated New Hanover County, NHCFR should establish response time models based on population zones that include recommended criteria for urban, suburban, and rural density levels. Based on the four-minute travel model, NHCFR would not be able to maintain most nationally recognized standards for response time models in urban population zones. The following figure illustrates the 10-minute travel model.

Figure 45: NHCFR 10-Minute Travel Model



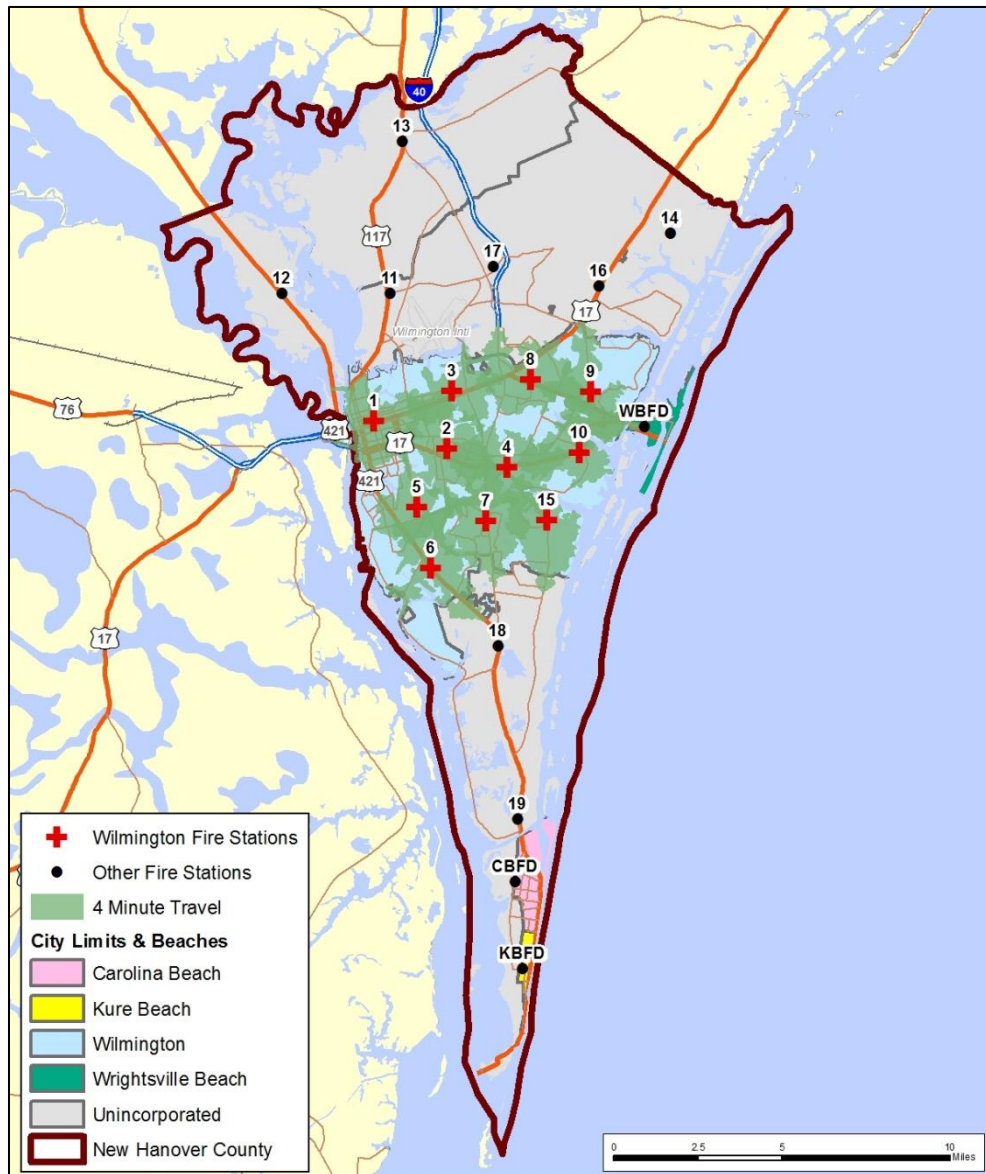
A much larger area can be reached within 10 minutes of travel from existing stations and an even greater area can be reached within 14 minutes as illustrated in the following figure.

Figure 46: NHCFR 14-Minute Travel Model



As can be seen from the previous figures, nearly 100 percent of New Hanover County can be reached within 14 minutes of travel from the existing station locations. The following figure applies the same methodology to WFD stations within a four-minute travel model. Since WFD is a totally career department serving an urban population density, the 10- and 14-minute travel models were not provided as they were for NHCFR.

Figure 47: WFD Four-Minute Travel Model

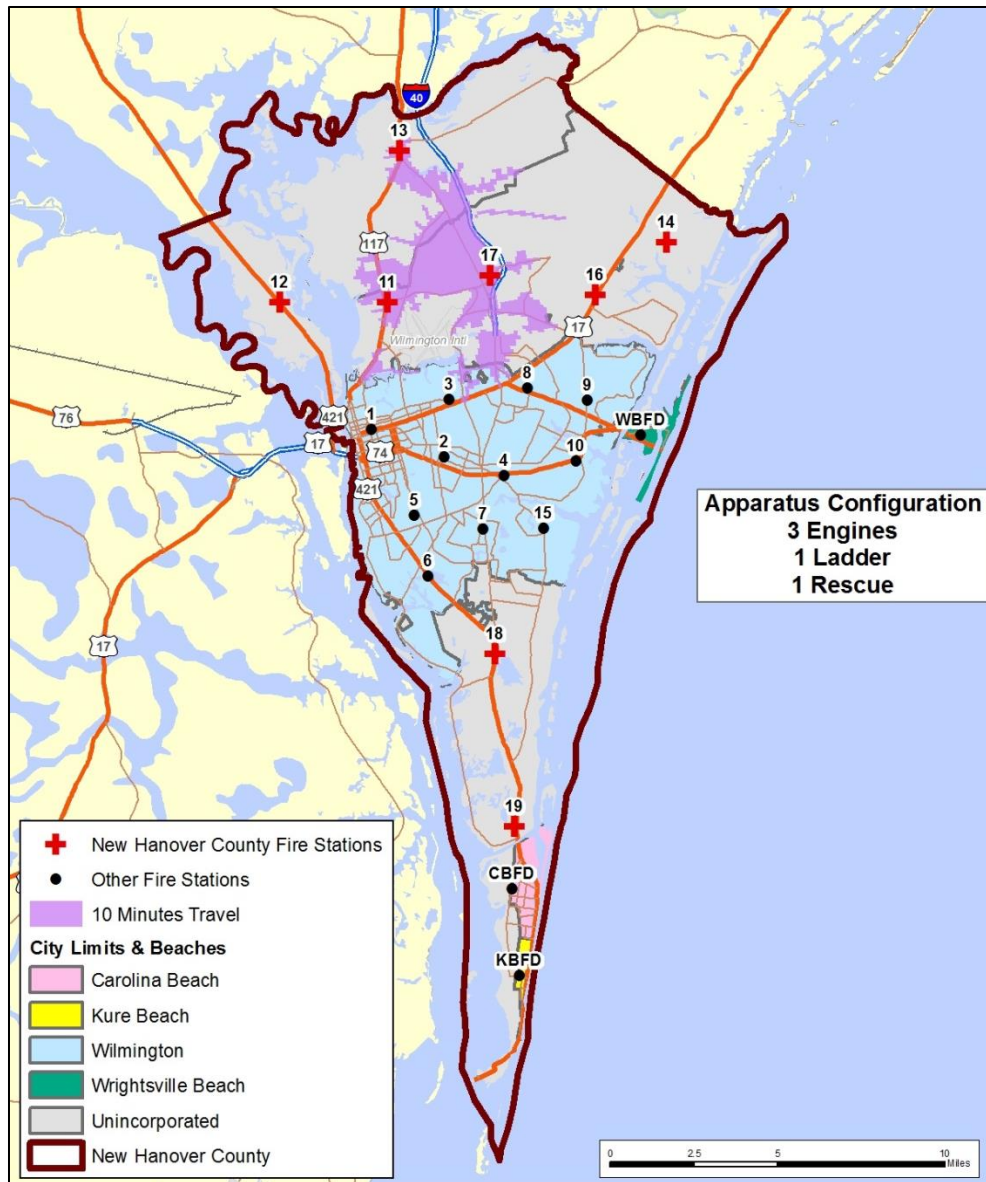


Given the distribution of WFD facilities, a majority of the city can be reached within four minutes of travel.

Concentration

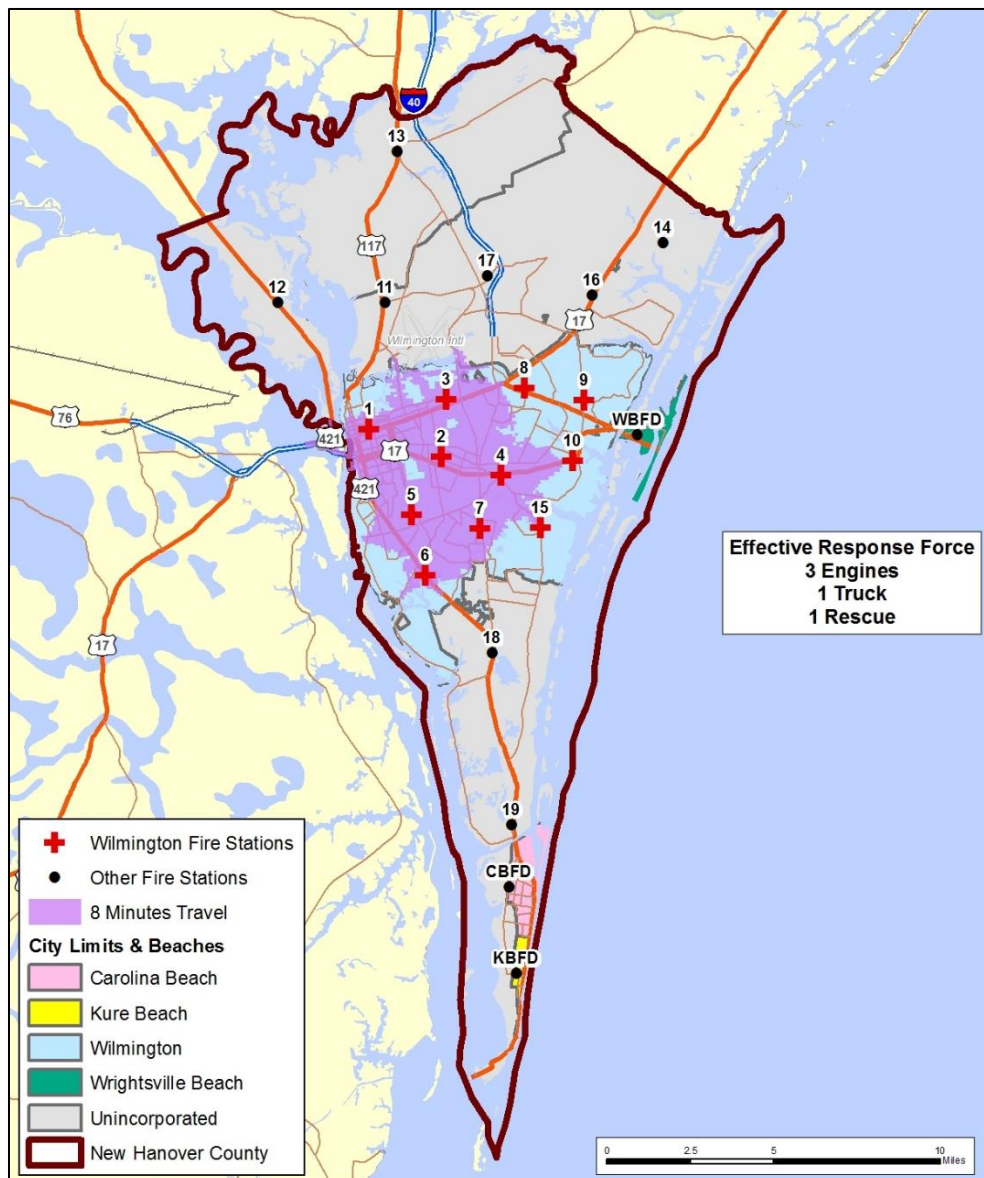
Concentration is an analysis of the department's ability to assemble an adequate amount of resources, personnel and/or apparatus, within a sufficient amount of time to effectively mitigate specific incidents, particularly structure fires. The following figure illustrates NHCFR's modeled concentration abilities based on the concentration of three engines, one aerial ladder/truck and one rescue.

Figure 48: Effective Response Force - NHCFR



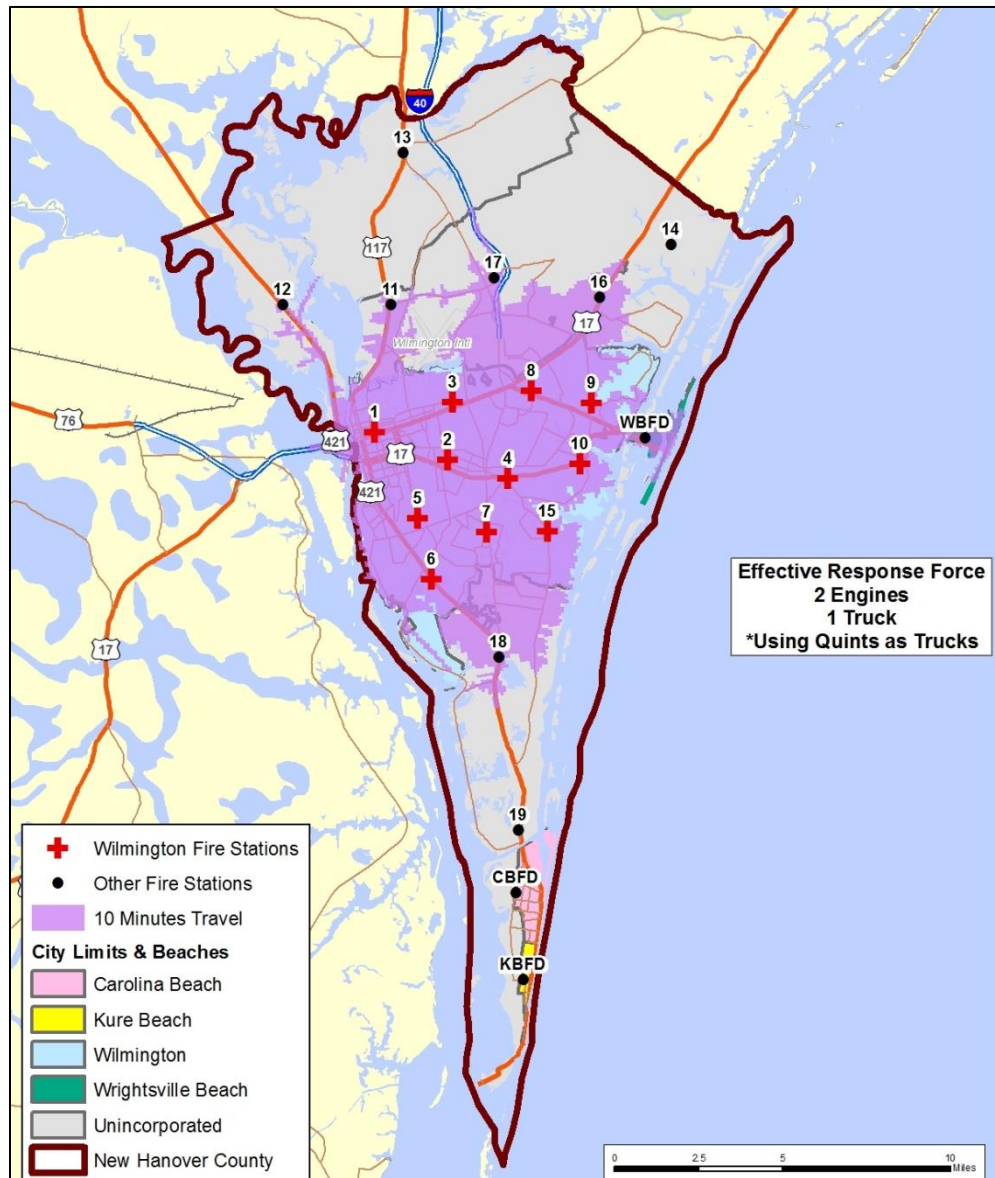
While NHCFR's effective response force capabilities appear to be limited to the areas just to the north of the City of Wilmington, these are some of the areas of highest population and structure density. The following figure illustrates the effective response force based on WFD's established policies of responding three engines, one aerial and one rescue to all structure fires.

Figure 49: Effective Response Force - WFD



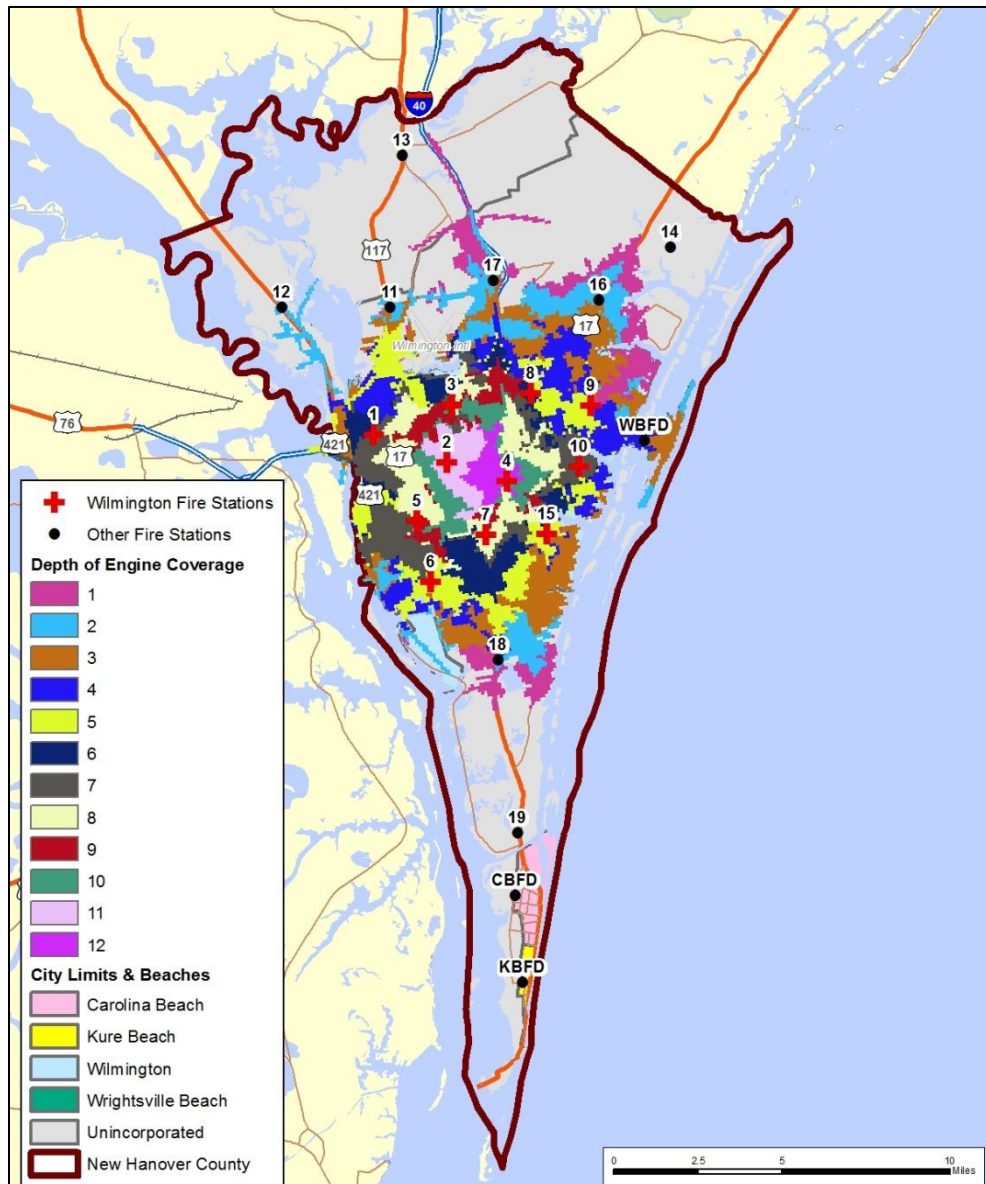
With the exception of areas in proximity to WFD Stations 8, 9, 10 and 15, the department's deployment is sufficient to meet the modeled apparatus concentration. Given the fact that WFD uses quint apparatus in some stations, the concentration analysis was conducted again considering the aerial capability of those apparatus. Since quints can be used as either an engine or an aerial depending on the location and type of incident combined with whether or not that apparatus is first in on a structure fire, concentration analysis was completed in a different manner. The following figure illustrates the 10 minute response capability of all quint apparatus in the WFD system.

Figure 50: Quint Travel Capability



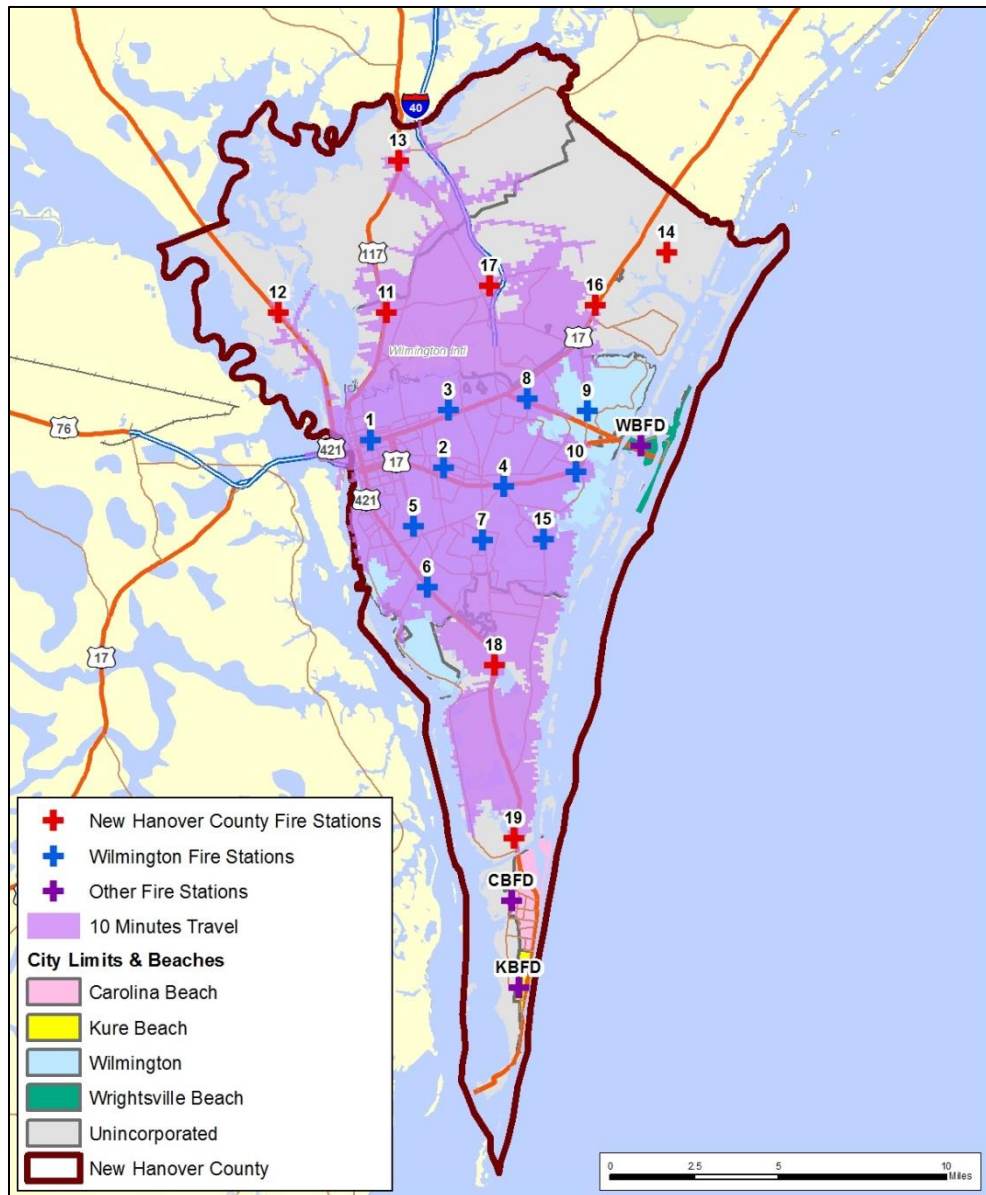
This is then combined with the engine concentration capability as illustrated below.

Figure 51: Engine Concentration - WFD



The analysis indicates that a vast majority of the city can achieve a response force of three engines and one aerial regardless of how the quint apparatus are used. The exceptions would be to the northeast of Stations 8 and 9. Combining resources between the two departments achieves a much greater area of coverage of the effective response force as shown in the following figure based on an assumed 10 minute travel rather than the current eight-minute objective for WFD.

Figure 52: Combined Effective Response Force



Reliability

The workload on emergency response units can be a factor in response time performance. The busier a given unit, the less available it is for the next emergency. If a response unit is unavailable, then a unit from a more distant station (or mutual aid department) must respond, increasing overall response time. A cushion of surplus response capacity above average values must be maintained due to less frequent but very critical times, when atypical demand patterns appear in the system. Multiple medical calls and multi-casualty events are examples.

One way to evaluate resource workload is to examine the frequency at which multiple calls occur within the same time frame on the same day. ESCI examined the calls during the last full year to find the frequency that each department is handling multiple calls within any time frame. Multiple calls occurring

at one time can stretch available resources and extend response times. As in most communities, the majority of calls throughout the NHCFR and WFD primary response (not including mutual aid) areas occur singularly. However, as communities grow and age, the propensity for concurrent calls increases. When call concurrency reaches a level to which it stretches resources to near capacity, response times begin to extend. Although medical calls will cause drawdown as concurrency increases, they usually occupy only one unit at a time. Multi-casualty incidents (such as motor vehicle accidents) may need additional ambulances and create periods of extensive resource drawdown in an area, as is the case with involved fire and/or rescue incidents. The following figure details the level of concurrency for each agency.

Figure 53: Incident Concurrency – 2013

	Single	2	3	4	5	6	7
NHCFR	75.8%	20.6%	3.0%	0.5%	0.1%	0.0%	0.0%
WFD	60.7%	28.9%	8.0%	1.8%	0.3%	0.0%	0.0%

Based on the analysis performed to generate the figure above, both departments most often experience incidents singularly. NHCFR experiences a concurrency rate of 20.6 percent when two incidents are occurring simultaneously while WFD experiences a rate of 28.9 percent where two incidents are occurring simultaneously with both departments experiencing higher numbers of multiple incidents occurring less frequently. Given the resources within each organization, the current level of reliability should be of little concern.

Insurance Ratings

Another method to evaluate distribution is in regard to Insurance Services Office (ISO) distances. ISO provides communities with a Public Protection Classification (PPC) that rates fire departments on their ability to provide service. The lower the PPC classification, the better the insurance rates for homeowners and business owners. To achieve the best PPC for distribution, properties should be within 1,000 feet of a hydrant, 1.5 miles from an engine, 2.5 miles from an aerial ladder, and five miles from the nearest fire station. The following two figures illustrate each department's 1.5 mile engine travel distance.

Figure 54: 1.5-Mile Engine Travel Distance - NHCFR

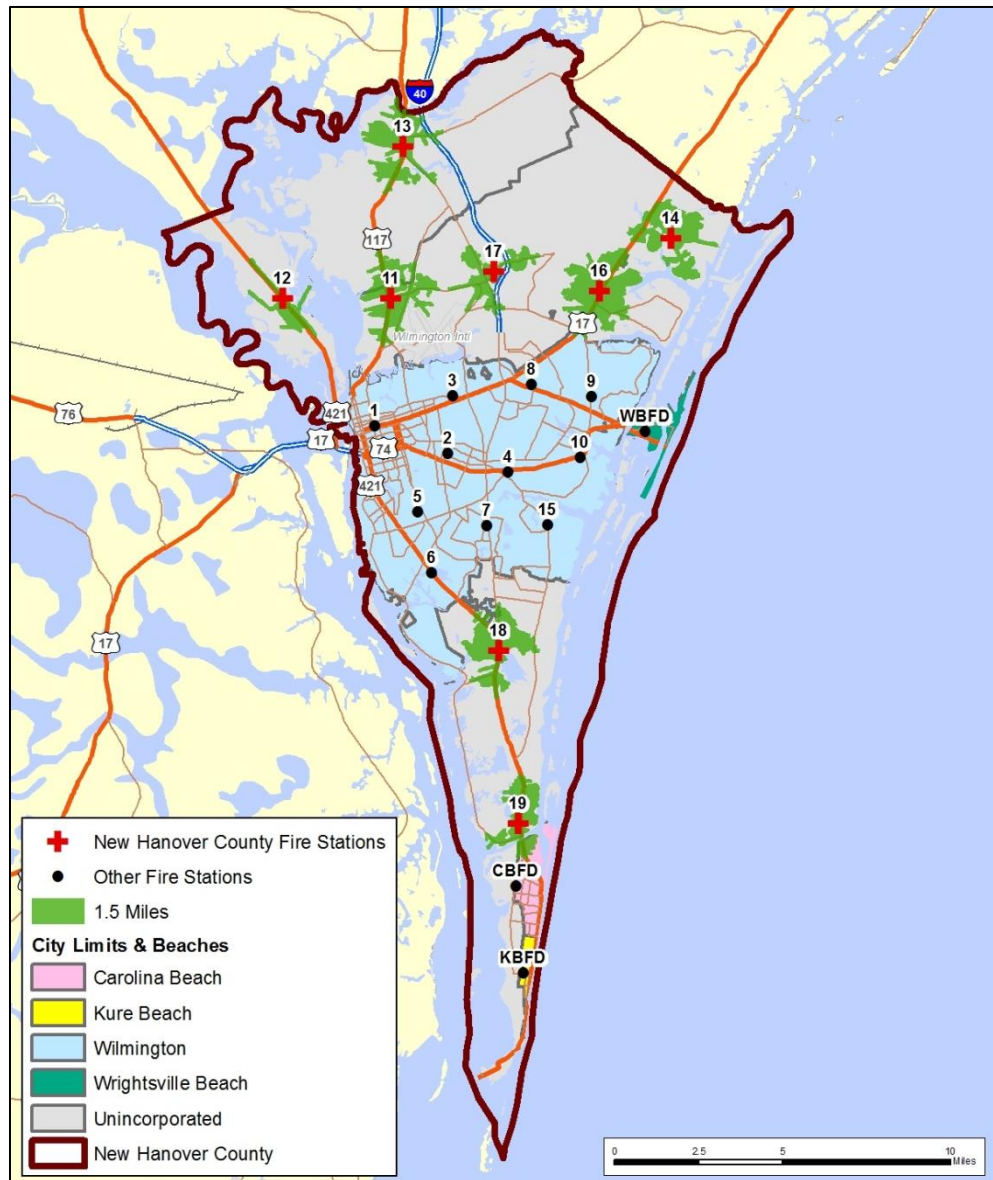
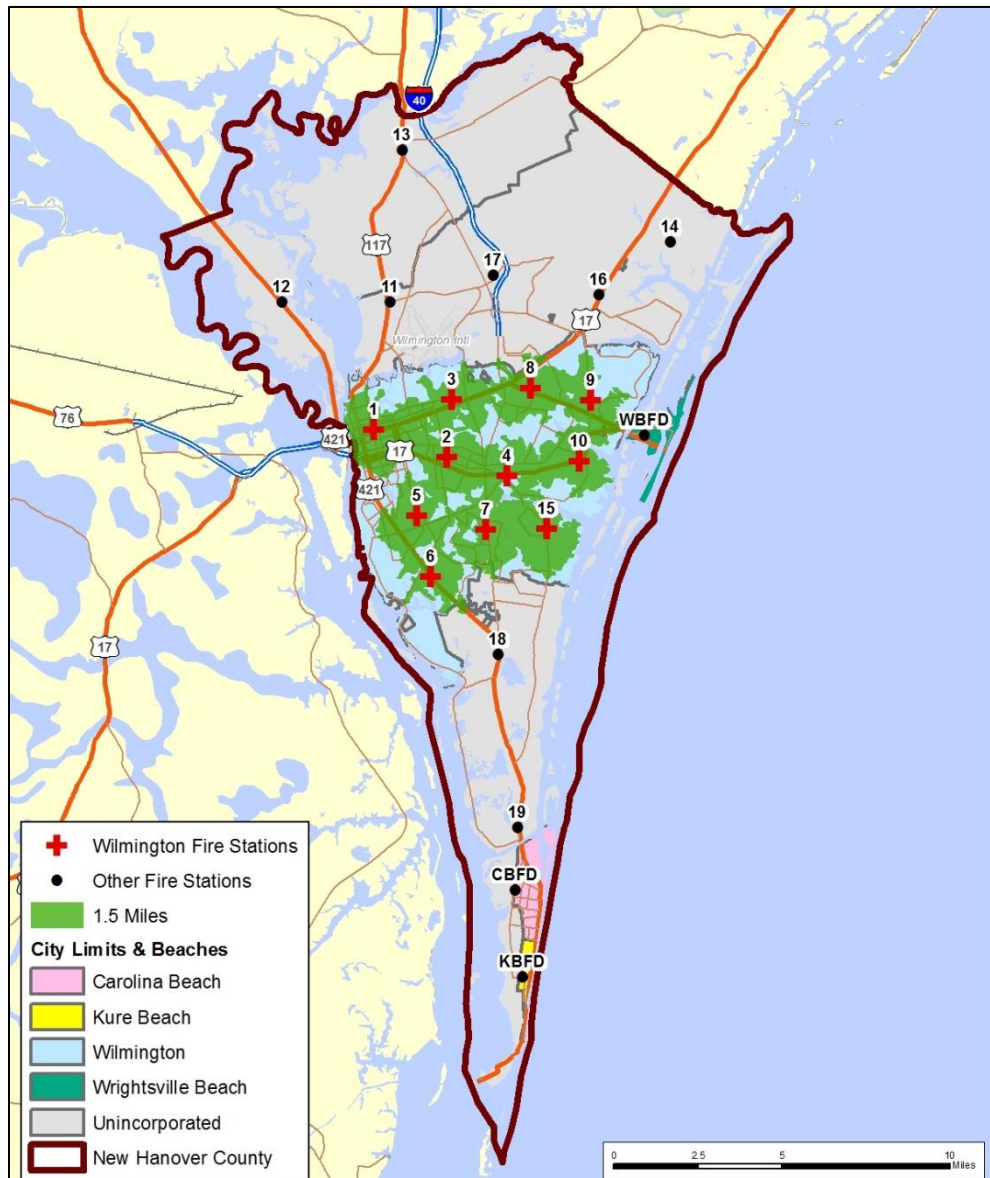


Figure 55: 1.5 Mile Engine Travel Distance – WFD



Each station houses at least one engine. Therefore, the distance from each station provides sufficient engine coverage. While not every property is within 1.5 miles of an engine, this is a common deployment of a large geographical area and typically, jurisdictions are rated as a whole rather by individual property in this regard. The following two figures provide the same illustration for the 2.5 mile aerial ladder travel capabilities.

Figure 56: 2.5 Mile Aerial Ladder Travel Distance – NHC

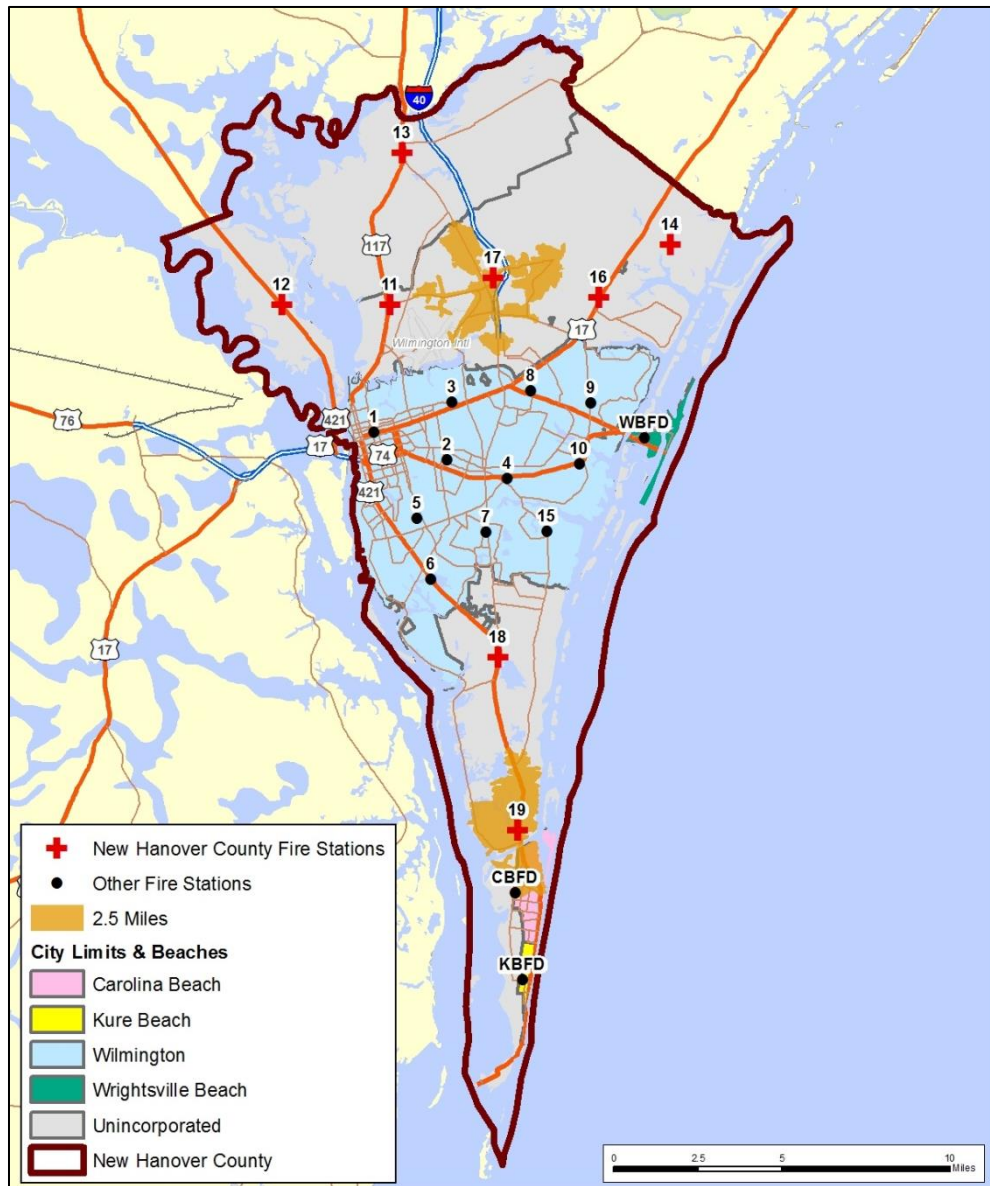
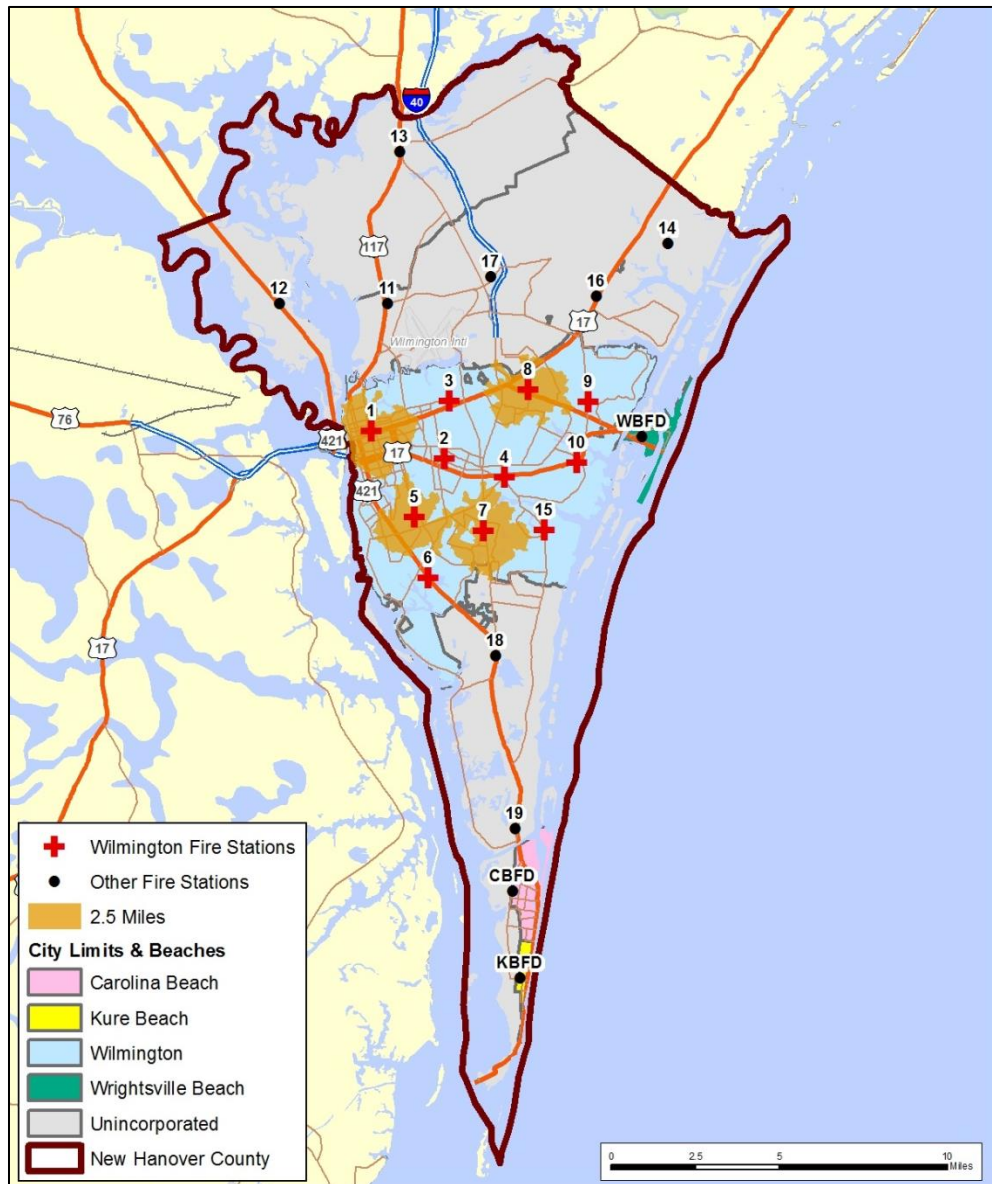
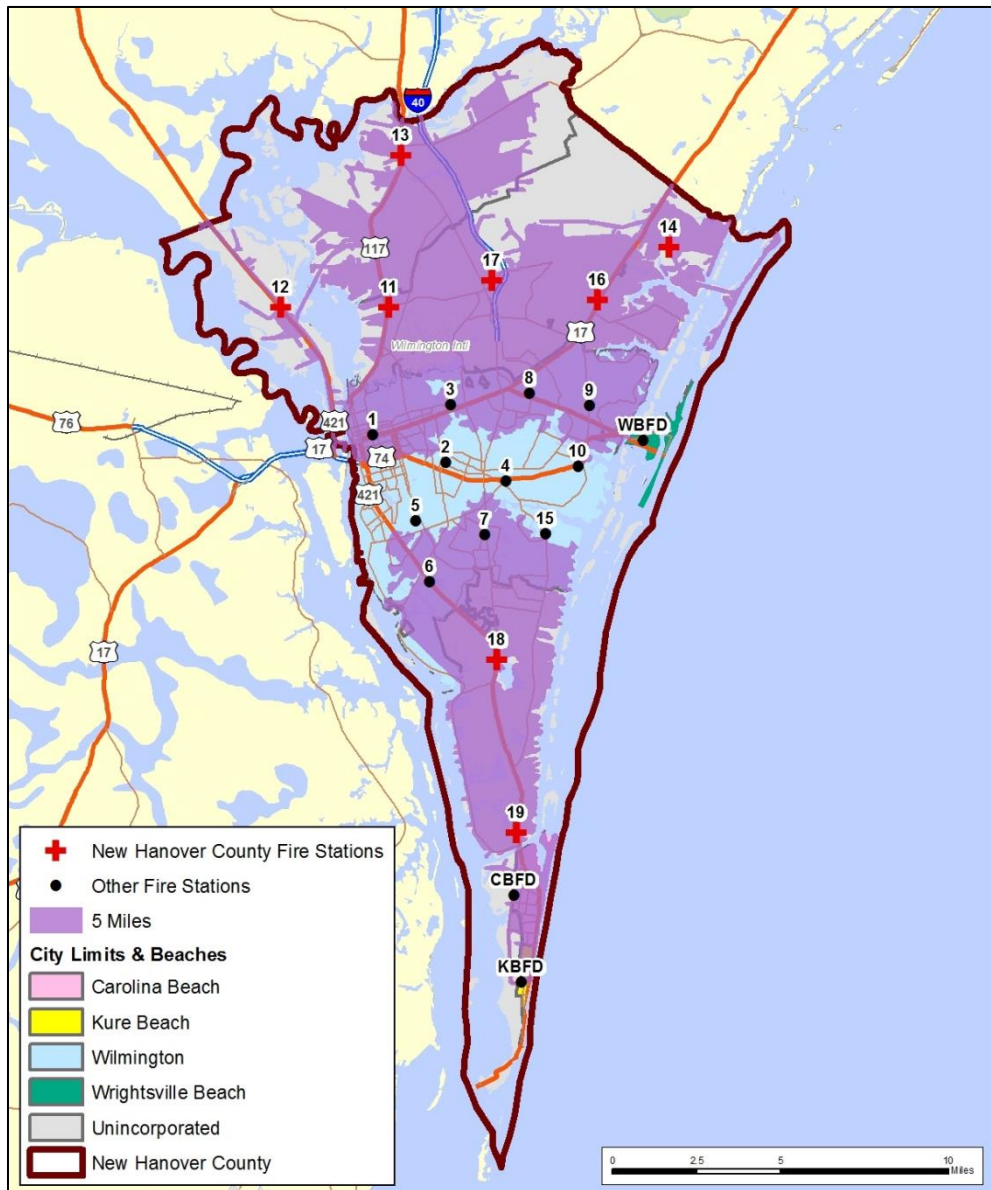


Figure 57: 2.5 Mile Aerial Ladder Travel Distance – WFD



As with the engine coverage, a large portion of the urban areas are sufficiently covered by an aerial ladder where large square-footage and multi-story buildings are present. Finally, for a homeowner or business owner to receive minimal insurance rates, many insurance companies require that those properties lie within five road miles of a fire station. The following figure illustrates the five mile travel distance from each existing station location within unincorporated New Hanover County.

Figure 58: Five-Mile ISO Travel Distance



As illustrated above most developed properties within the study area are within five miles of an existing station with the exception of some areas in extreme northeastern New Hanover County. Regardless of these models, NHCFR has been able to secure an excellent insurance rating based on the department's ability to provide service and water to areas that have been historically underserved. This analysis was not necessary for WFD since none of their properties are outside of a five mile travel distance from existing stations.

Response Performance

When discussing emergency services organizations, the primary issue of question is response performance. Response performance analysis evaluates how quickly an organization responds to an

incident and is more commonly known as response time. The response time continuum, the time between when the caller dials 9-1-1 and when assistance arrives, is comprised of several components:

- Processing Time – The amount of time between when a dispatcher answers the 9-1-1 call and resources are dispatched.
- Turnout Time – The amount of time between when units are notified of the incident and when they are en route.
- Travel Time – The amount of time the responding unit actually spends on the road to the incident.
- Response Time – A combination of turnout time and travel time and generally accepted as the most measurable element.

Other performance measurements are also valuable but not utilized in this analysis of staffing and deployment, such as:

- Patient Contact Time – The actual time personnel arrived at the patient and began treatment.
- Scene Time – The total amount of time resources have spent on the emergency scene prior to transport or clearing the incident.
- Transport Time – The total amount of travel time spent transporting the patient to a definitive care facility.
- Hospital Time – The total amount of time the transporting unit spent at the receiving facility before returning to service.
- Total Commit Time – The total amount of time between dispatch and clearing the incident.

Given the fact that neither of the study agencies provides transport emergency medical services, this report will focus on the first four response performance measures of processing, turnout, travel, and response. Non-emergency incidents were removed from the data as much as possible as were non-apparatus units such as command and support vehicles.

The “average” measure is a commonly used descriptive statistic also called the mean of a data set. It is a measure which is a way to describe the central tendency, or the center of a data set. The average is the sum of all the points of data in a set divided by the total number of data points. In this measurement, each data point is counted and the value of each data point has an impact on the overall performance. Averages should be viewed with a certain amount of caution because the average measure can be skewed if an unusual data point, known as an outlier, is present within the data set. Depending on the sample size of the data set, this skewing can be either very large or very small.

As an example, assume that a particular station with a response time objective of six minutes or less had five calls on a particular day. If four of the calls had a response time of eight minutes while the other call was across the street and only a few seconds away, the average would indicate the station was achieving its performance goal. However, four of the five calls, or 80 percent, were beyond the stated response time performance objective.

The reason for computing the average is because of its common use and ease of understanding. The most important reason for not using averages for performance standards is that it does not accurately reflect the performance for the entire data set.

With the average measure, it is recognized that some data points are below the average and some are above the average. The same is true for a median measure which simply arranges the data set in order and finds the value in which 50 percent of the data points are below the median and the other half are above the median value. This is also called the 50th percentile.

When dealing with percentiles, the actual value of the individual data does not have the same impact as it did in the average. The reason for this is that the percentile is nothing more than the ranking of the data set. The 90th percentile means that 10 percent of the data is greater than the value stated and all other data is at or below this level.

Higher percentile measurements are normally used for performance objectives and performance measurement because they show that the large majority of the data set has achieved a particular level of performance. This can then be compared to the desired performance objective to determine the degree of success in achieving the goal.

For this analysis, ESCI was most interested in the ability to respond the appropriate resources to the highest percentage of incidents. For this reason, ESCI analyzed National Fire Incident Reporting System (NFIRS) data and generated average, 80th and 90th percentile response performance for emergency incidents only. In addition, while NFIRS data does not require the recording of call pick-up versus dispatch time (producing call processing time) or the en route time (producing turnout time), computer aided dispatch data for the same period was also evaluated to extract this information. Although presented together, the performance of each agency should be viewed individually since each agency adheres to their own independent response performance objectives. The analysis begins with an evaluation of call processing performance as provided below. The average is provided for illustration purposes only.

Figure 59: Call Processing Performance – 2013

	NHCFR	WFD
Average	0:02:18	0:01:58
90th Percentile	0:03:44	0:03:31
95th Percentile	0:04:53	0:04:52

NFPA 1221 provides recommendations regarding call processing performance for agencies that dispatch fire resources. The standard recommends that 95 percent of all emergency incidents be dispatched within 60 seconds of call receipt. No differences is cited between medical and fire responses. As can be seen in the figure above, call processing times are well outside the expected range for emergency incidents. While the fire department does not have direct control of the communications centers, each department should apply necessary influence to ensure that resources are being dispatched appropriately and effectively. The next phase of emergency response is that of turnout.

Turnout is the time it takes personnel to receive the dispatch information, move to the appropriate apparatus and proceed to the incident. *NFPA 1710* provides for two different turnout time performance objectives in this regard; 60 seconds for medical responses and 80 seconds for fire responses; allowing personnel additional time to don personal protective equipment; both measured at the 90th percentile. The following figure summarizes turnout time performance both study agencies.

Figure 60: Turnout Time Performance – 2013

	NHCFR	WFD
Average	0:01:17	0:01:06
80th Percentile	0:01:40	0:01:26
90th Percentile	0:02:03	0:01:48

When measured at the 90th percentile, the departments fall outside the published performance objective. Although the established objectives are relatively aggressive, both departments are performing at a level comparable to other agencies ESCI has worked with. The next performance objective is that of travel time.

Figure 61: Travel Time Performance – 2013

	NHCFR	WFD
Average	0:04:30	0:03:17
80th Percentile	0:05:55	0:04:07
90th Percentile	0:07:09	0:05:17

NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments includes a performance objective of 240 seconds or less travel time for the arrival of the first arriving engine company in urban areas serviced by career fire departments.⁶ Based on the CAD data provided, WFD is just over a minute longer in travel time that recommended by *NFPA 1710*.

NFPA 1720 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer or Combination Fire Departments recommends a response performance objective of nine minutes or less when measured at the 90th percentile in urban areas, 10 minutes or less in suburban areas, and 14 minutes or less in rural areas served by volunteer or combination fire departments.⁷ *NFPA 1710* does not differentiate between the various population densities and assumes that all areas served by career or mostly career fire departments will adhere to a single performance objective. The following figure summarizes each department's travel time performance during calendar year 2013 as recorded within the CAD system.

⁶*NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments.* (National Fire Protection Association 2010.)

⁷*NFPA 1720, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer and Combination Fire Departments.* (National Fire Protection Association 2010.)

Figure 62: Total Response Performance – 2013

	NHCFR	WFD
Average	0:05:35	0:04:22
80th Percentile	0:07:10	0:05:33
90th Percentile	0:08:28	0:06:31

The total response performance for each study area is considered to be excellent given the large geographic area of coverage, particularly in the unincorporated areas. Based on the analysis, NHCFR is within both the urban and suburban response performance recommendations while WFD is only slightly outside the recommendation at the 90th percentile.

Section Observations:

Below are recommendations contained within the previous agency evaluations that have not been implemented and are still recommended for consideration by the respective department.

New Hanover County 1998 Feasibility Study

- All recommendations have been implemented.

New Hanover County 2009 Feasibility Study

- All recommendations have been implemented.

City of Wilmington 2006 Fire Department Assessment

- Consider the implementation of traffic pre-emption devices to expedite travel time on city streets.
- Continue to evaluate and analyze out-of-position responses.

SUPPORT PROGRAMS

Although the delivery of fire suppression and emergency medical services is at the core of each department’s mission, additional core activities are necessary to support every emergency services agency. These activities provide the basis for community risk reduction, preventive maintenance, planning and development, employee training and education, career development, logistical support, public safety education, fire prevention, and code enforcement.

Preventive Maintenance and Repair

Vehicle maintenance and equipment repair is a critical element to ensure that services are provided in an interrupted manner. There are a number of methods by which to accomplish this task; from in-house comprehensive maintenance facilities, to outsourcing various elements, to a complete outsourcing of all maintenance needs. This section reviews how the study departments handle their maintenance and equipment repair functions.

New Hanover County

NHCFR has several personnel in-house that are charged with ensuring that all vehicles and equipment are in working order and ready for service. Small repairs are done in-house while major equipment issues are sent to external vendors; some as far away as several hours. The primary issue of concern within the organization is that of major apparatus repair that is accomplished by an external vendor in Fayetteville, NC. The length of the travel time to this facility added to the down time while the unit is repaired along with a number of other organizations’ apparatus leaves the department short on critical apparatus. The department should explore a cooperative or shared service with the city regarding apparatus maintenance and repair.

City of Wilmington

WFD maintains an internal apparatus and equipment repair section within the fire department. All repairs to equipment, apparatus, and tools are completed internally. Methods by which to obtain repair of a piece of equipment is contained within the department’s standard operating guidelines. The following figure summarizes the vehicle and equipment maintenance elements.

Figure 63: Vehicle and Equipment Maintenance

	NHCFR	WFD
Vehicle maintenance facility	Off-Site	Internal, third party specialty inspection
Processes for requesting repair or maintenance	Responsibility of officers	Contained within SOGs

Training Programs

Providing safe and effective fire and emergency services requires a well-trained workforce. Training and education of personnel are critical functions for each study agency. Without quality, comprehensive training programs, emergency outcomes are compromised and emergency personnel are at risk. One of the most important jobs in any department is the thorough training of responders. The personnel have the right to demand good training and the department has the obligation to provide it.

Initial training of newly hired firefighters is essential, requiring a structured recruit training and testing process. Beyond introductory training, personnel need to be actively engaged on a regular basis and tested regularly to ensure skills and knowledge are maintained. To accomplish this task, the fire department must either have a sufficient number of instructors within its own organization or be able to tap those resources elsewhere. The training program should be based on a structured annual plan and educational sessions should be formal and follow prescribed lesson plans that meet specific objectives. The following figure summarizes the training program elements among the study departments.

Figure 64: Summary of Training Program Elements

	NHCFR	WFD
Initial Training of Personnel Conducted By	This agency	This agency
Firefighter Training Required Prior to Scene Response	Mandatory Firefighter I and II course, Hazmat-operations level, EMT, Rescue	Mandatory Firefighter I and II course, Hazmat-operations level, EMT, Shipboard FF
Firefighter Training Required to Leave Probation/Trainee Status	Mandatory Firefighter I and II course, Hazmat-operations level, EMT	other Admin procedures check off book
Established Minimum Training Hours Annually	Yes	Yes
Minimum Training Hours Annually by Duty		
<i>Firefighter</i>	<i>240</i>	<i>240</i>
<i>EMT</i>	<i>24</i>	<i>24</i>
<i>Paramedic</i>	<i>0</i>	<i>0</i>
<i>First responder</i>	<i>0</i>	<i>0</i>
<i>Hazmat technician</i>	<i>9</i>	<i>24</i>
<i>Apparatus driver/operator</i>	<i>12</i>	<i>12</i>
<i>Fire officer</i>	<i>12</i>	<i>12</i>
<i>Fire inspector</i>	<i>6</i>	<i>6</i>
<i>other</i>	<i>0</i>	<i>0</i>
All Position Minimum Requirements Follow NFPA Standards	Yes	Yes
Consistent Officer Training Provided	Yes	Yes
Consistent Driver/Operator Training Provided	Yes	Yes
Individual Responsible for Training Program	Battalion Chief of Development and Standards	Battalion Chief of Training
Number of Certified Fire Instructors in Agency		
<i>Fire</i>	<i>65</i>	<i>80</i>
<i>EMS</i>	<i>3</i>	<i>4</i>
<i>Other</i>	<i>2</i>	<i>27</i>
All Company Officers Trained in Instructional Technique	Yes, certified	Yes, certified

	NHCFR	WFD
Annual Training Plan Prepared and Followed	Yes	loosely, but goal is to become more formal with this
Training Program Has Software and Data Support	Yes, specific RMS system	Yes, specific RMS system
Training Program Has an Identified Program Budget	Yes	Yes
Training Resources Available	Formal classroom(s), Appropriate AV equipment, Training library, Formal drill ground area, Drill tower-owned, Training apparatus and equipment, EMS training supplies, EMS training manikins, simulators	Formal classroom(s), Appropriate AV equipment, Training library, Formal drill ground area, Drill tower-owned, Training apparatus and equipment, EMS training supplies, EMS training manikins, simulators
Standard Training Curriculum Manuals Used	IFSTA, EMS is Jones and Bartlett	IFSTA, Jones and Bartlett for EMS
Lesson Plans Utilized	For most training sessions	For certification classes only
Night Drills Conducted	Quarterly	Quarterly
Multi-Company Drills Conducted	Monthly	Monthly
Regional Disaster Drills Conducted	Annually, by Emergency Management agency	Annually, by Emergency Management agency
Periodic Physical Performance Evaluation to Ensure Personnel Maintain Physical Capacity to Perform Duties	Yes, formal physical ability test	Yes, formal physical ability test
Periodic Skills Competency Test to Ensure Personnel Maintain Competency in Job-Required Skills	Yes, formal skills competency check-off program	Yes, combined with periodic physical ability evaluations
Post-Incident Analysis	Conducted for all major incidents	Conducted for all major incidents
Safety Officer for Drills	As indicated by training objectives	Senior student assigned as safety officer for most drills
Training Records	Individual attendance records computerized, searchable	Individual attendance records computerized, searchable

Logistical Support Services

Logistics is the term used to describe what used to be called “supplies.” It refers to the procurement, management, and delivery of the goods and materials required to keep a fire department’s emergency responders equipped with the things they need. This also includes the materials needed by office staff and other support divisions to carry out their parts of the organization’s overall mission. Of course, that leads back to the support of those personnel carrying out the department’s core missions.

The logistics team is responsible for the day-to-day management of inventory purchase, storage, and delivery. Doing that job effectively requires attention to the purchasing of supplies—deciding which vendors to use, how much to keep on hand, and how to keep that inventory safe from misuse or loss.

Radio communications, essential to firefighter safety as well as fireground effectiveness, requires complex equipment that tends to present high maintenance costs. NHCFR and WFD have assigned responsibility for communications equipment as listed below.

Figure 65: Communications Equipment and Systems

	NHCFR	WFD
Communications equipment and systems	Handled through resource services division and coordinated through New Hanover County Public Safety Communications	Handled through logistics division and coordinated through New Hanover County Public Safety Communications

At one time it was not unusual to find large quantities of certain supplies stored in fire department facilities. Today, most departments adhere to a just-in-time philosophy, recognizing that certain supplies can be “stockpiled” at the various vendors rather than in a department facility. The main exceptions to this rule are those items identified as “mission critical” or which are difficult to obtain on short notice. Certain firefighting supplies and equipment fall into this category.

Figure 66: Supply Request and Delivery Systems

	NHCFR	WFD
Station supplies	Resource services division	Logistics division
Firefighting supplies and small equipment	Resource services division	Logistics division
EMS supplies and equipment	Resource services division	Logistics division

In the area of purchasing there are two issues: who to buy from, and how to process those purchases. The first is managed through the logistics function. The second is more commonly managed through the finance function (with logistics following policies and practices dictated by finance). In smaller organizations the logistics and finance functions may reside in the same individual or office. In larger organizations they may be separate, but they still work together closely.

Figure 67: Purchasing Systems

	NHCFR	WFD
Purchase ordering process	Defined in policy	Defined in policy
Inventory and equipment/supply access	Limited to resource services personnel	Limited to logistics personnel

A well-organized logistics function will also analyze the market regularly to make sure that its current vendors still provide the best value to the department. Value is defined as a combination of both price and reliability. The well-run logistics function also incorporates safeguards to ensure against both complacency and fraud. The ordering of office supplies and toilet paper may be mundane, but it is in the area of relatively small purchases that public sector fraud is discovered at times.

Figure 68: Inventory Storage and Controls

	NHCFR	WFD
Centralized inventory facilities/systems	Central supply warehouse maintained at various logistics buildings.	Central supply warehouse maintained at Headquarters station
Equipment/supply ordering	Defined in policy	Defined in policy
Equipment/supply delivery	Resource services division	Logistics division

Life-Safety Services (Fire Prevention)

An aggressive risk management program, through active fire and life safety services, is a fire department's best opportunity to minimize the losses and human trauma associated with fires and other community risks.

The National Fire Protection Association recommends a multifaceted, coordinated risk reduction process at the community level to address local risks. This requires engaging all segments of the community, identifying the highest priority risks, and then developing and implementing strategies designed to mitigate the risks.

The most effective way to combat fires is to prevent them. A strong fire prevention program, based on effective application of relevant codes and ordinances, reduces loss of property, life, and the personal disruption that accompanies a catastrophic fire. A fire department should actively promote fire resistive construction, built-in warning and fire suppression systems, and maintenance of fire safe buildings to minimize risk to fire and health challenges.

The following figure summarizes the study departments' life-safety services elements.

Figure 69: Summary of Life Safety Services Elements

	NHCFR	WFD
Applicable Fire Code	International Fire Code model, code is state-wide minimum	International Fire Code model, code is state-wide minimum
Local Sprinkler Requirements Exceeding Model Code	None	None
Agency Involvement in New Commercial Construction	Agency requires plan submittal, site review conducted, plan review conducted locally, inspection prior to occupancy, sign-off required, observed flow test required for sprinkler system, observed test required for fire alarm system in public assembly	Agency requires plan submittal, site review conducted, plan review conducted locally, inspection prior to occupancy, sign-off required, observed flow test required for sprinkler system, observed test required for fire alarm system in public assembly
Key-Vault Entry Box Program	Yes, required for sprinklered or alarmed occupancies	Yes, required for sprinklered or alarmed occupancies

	NHCFR	WFD
Inspections Conducted by This Agency	All commercial occupancies, all industrial occupancies, all assembly occupancies, all institutional occupancies, licensed liquor establishments, high-risk occupancies, multi-unit residential occupancies	All commercial occupancies, all industrial occupancies, all assembly occupancies, all institutional occupancies, licensed liquor establishments, high-risk occupancies, storage tank installation/modification/removal, multi-unit residential occupancies
Number of Occupancies on Scheduled Inspection List	4,869	8,322
Self-Inspection Incentive Program	No	No
Inspection Frequency for High-Risk Occupancies	Annually	Annually
Inspection Frequency for Moderate-Risk Occupancies	Every third year	Annually
Inspection Frequency for Low-Risk Occupancies	Every third year	Every third year
Number of Initial Inspections Conducted Prior Year	3,147	5,329
Number of Reinspections Conducted Prior Year	985	664
Formal Citation Process	Formal process	Formal process
Number of Full-Time (FTE) Staff Assigned Solely to Inspection Function	3	5
Company Personnel Conduct Inspections	No	Yes
Formal Training for Inspectors	Formal inspection certification	Formal inspection certification
Public Education Officer/Program Manager Assigned	Yes, part-time assignment	Yes, full-time assignment
Topics Included in Public Education Programs	Residential exit plans/drills, Smoke alarm use, general fire safety, fire extinguisher use, injury prevention, elderly care and safety	Residential exit plans/drills, smoke alarm use, general fire safety, fire extinguisher use, injury prevention, elderly care and safety
Publications Stocked and Distributed	Yes	Yes
Formal Public Education Training Provided to All Personnel	Yes	Yes, during recruit academy
Number of Formal Public Education Contact Events Prior Year	374	247
Level of Fire Investigation Provided by Agency Itself	Arson investigation	Arson investigation
Additional Fire Investigation Resources Available	Regional fire investigation team	Regional fire investigation team

	NHCFR	WFD
Individual Responsible for Fire Investigations	Deputy Chief	Battalion Chief
Formal Training for All Personnel	Scene control and evidence quarantine	Scene control and evidence quarantine
Formal Training for Specified Fire Investigators	Scene control and evidence quarantine, initial fire cause and origin, arson detection and investigation, formal fire investigation certification	Arson detection and investigation, formal fire investigation certification, National Fire Academy course
Investigation Program Guided by NFPA 921	Yes, working toward full compliance	Yes
Juvenile Firesetter Program	Local agency program with trained personnel	Local agency program with trained personnel

Section Observations:

Below are recommendations contained within the previous agency evaluations that have not been implemented and are still recommended for consideration by the respective department.

New Hanover County 1998 Feasibility Study

- All recommendations have been implemented.

New Hanover County 2009 Feasibility Study

- All recommendations have been implemented.

City of Wilmington 2006 Fire Department Assessment

- All recommendations have been implemented.

Current Recommendations

- NHCFS should work with WFD to begin contracting for apparatus and equipment maintenance within the city's maintenance facility.

Since the completion of the previous studies, WFD has also created a Community Risk Reduction section that focuses on the delivery of prevention programs throughout the jurisdiction. This program will allow a greater level of focus on community prevention education programs and should serve as a stepping stone for future collaborative regional efforts in this regard.

Future Opportunities for Cooperative Efforts

The preceding sections of this document are intended to provide the reader with an overview of each of the study agencies and how they compare and contrast to one another. The overall goal of this project, however, is to determine if and how these organizations can work more closely in the future in a more efficient and effective way. This portion of the report will focus on the future of the study agencies and will provide options for shared services that will provide a better overall service to the community.

OPTIONS FOR SHARED SERVICES

Three basic strategies are generally available when considering cooperative efforts and shared service delivery, beginning with a do-nothing approach (status quo) and ending with complete unification of two or more organizations into what is, essentially, a new emergency service provider. A description of the three primary methodologies; functional consolidation, operational consolidation, and legal merger, is found below.

Functional Consolidation

Public entities usually have broad authority under law to enter intergovernmental agreements (IGAs) for the purpose of cost and service efficiency. North Carolina is no different in this regard. The laws of the State of North Carolina address the issue, allowing intergovernmental contracts for any lawfully authorized governmental function.

Examples of this type of cooperative effort may include any function within the study departments that allows them to deliver services, such as maintenance, training, fire prevention, equipment purchasing, logistics, etc. Through functional consolidations, each agency benefits from the resources of the whole while maintaining independence as separate organizations. Many times, functional consolidations serve as a prelude to a further future collaborative initiatives including legal unification and merger.

The following strategies are those that may be implemented as separate, stand-alone, agencies, absent legal merger and they may be viewed as a pre-cursor to future, more formal consolidation and/or merger initiatives.

Enhanced Use of Mutual and Automatic Aid

The agencies in the study area currently utilize mutual and automatic aid and have already entered into an agreement to provide closest unit response to areas along the periphery of the City of Wilmington. In this situation, regardless of jurisdiction, the closest available unit is dispatched to emergency situations. In some cases, WFD resources are responding into the unincorporated areas and, in other cases, NHCFR resources are responding into the City of Wilmington as first due apparatus. If more closely examined, opportunities to further enhance existing practices may be recognized.

Enhanced Mutual and Automatic Aid Agreements		Timeline: Short term
Objective: Enhance existing mutual and automatic aid agreements and formalize those agreements with county commission and city council approval.		
Summary Background: One of the most elemental levels of cooperative service delivery is that of the sharing of valuable resources, both equipment and personnel. A primary means for sharing resources is by the use of mutual and automatic aid. Mutual aid involves establishing agreements under which a fire department can request and receive equipment and personnel support for an emergency incident from a neighboring fire department. Automatic aid is the same, with the exception that it is automated based on dispatch protocols, absent the need for an incident commander to request the assistance.		
Policy Action: Review mutual aid and automatic aid procedures that are currently in place to identify opportunities to increase effectiveness. In jurisdictions for which automatic aid procedures have not yet been established, complete the implementation process. Review response times, including the maps provided in this report, to identify areas in which automatic aid can be initiated to enhance response. Do not limit consideration to the study agencies, but include review of station locations and travel times from other neighboring fire departments.		
Pro	Con	
<ul style="list-style-type: none"> • Identification of responsibilities, duties, and liabilities. • More efficient response. • Reduced requirements on command personnel (automatic dispatch). • Increased interdepartmental cooperation. 	<ul style="list-style-type: none"> • Potential of imbalance in responses. • Substantial differences in current equipment load lists, compartmentation, and staffing models. 	
Fiscal Considerations:		
<ul style="list-style-type: none"> • Number and frequency of responses. • Volume of equipment and personnel sent to incidents outside of the agency's jurisdiction. • The cost of implementing these practices is generally offset by the fact that a similar level of assistance is provided by another agency in return. As a result, an organization may be able to avoid costs if mutual or automatic aid resources are made available instead of adding new stations, apparatus, and personnel to provide coverage in a response area. 		

Pre-Incident Planning

More effective use of pre-incident planning practices in the agencies will increase effectiveness of fire suppression efforts while also increasing firefighter safety.

Develop Uniform Pre-Incident Planning Processes		Timeline: Short term
Objective: Provide a system of shared operational plans for use during emergencies and non-emergent incidents.		
Summary Background: Pre-incident plans are an important part of the emergency response system to provide essential information on specific structures and processes. Through timely planning, strategy and tactics can be developed before an emergency occurs. Pre-incident planning involves evaluating protection systems, building construction, contents, and operating procedures that may impact emergency operations.		
Policy Action: Inventory current pre-incident planning development in each agency. Evaluate commonality between current systems of pre-incident planning. Consider the establishment of a committee to develop building criteria and data for inclusion in pre-incident plans. Develop a timeline for the implementation, completion, and review of pre-incident plans.		
Pro	Con	
<ul style="list-style-type: none"> Increased safety for all regional responders. More accuracy in planning of critical properties and high risk occupancies. 	<ul style="list-style-type: none"> Potential variation in pre-planning software and data collection processes that will need to be merged. 	
Fiscal Considerations:		
<ul style="list-style-type: none"> Current hardware and software assets and cost to upgrade or purchase hardware and software, if desired. Number of facilities/buildings with existing pre-incident plans versus those yet to be developed. Pace of new construction requiring pre-incident plans. Personnel costs to gather and assemble plans. Unquantifiable potential for prevention of injury or death to emergency responders and the public. 		

Administrative and Support Services

Each department currently maintains its own individual administrative and support complements as previously discussed. Consolidation of those resources into a single element could reduce overall personnel costs and allow the departments to work more closely together under a single administration, support, and command structure.

Combine Administrative and Support Services		Timeline: Short term
Objective: Combine the administrative elements of the study agencies to promote improved efficiencies by eliminating duplication across the county.		
Summary Background: An administrative consolidation occurs when two or more agencies maintain their separate legal status and separate operational elements but combine some or all of their administrative functions such as overall oversight authority, training duties, fire prevention duties, clerical responsibilities, and logistical elements.		
Policy Action: Evaluate current administrative and support duties and responsibilities. Identify redundancies and potential reductions. Determine appropriate levels of staff.		
Pro <ul style="list-style-type: none"> Improved interdepartmental consistency in human resources, hiring, payroll, and other administrative functions. Reduction in redundancy resulting in better efficiency. Potential for moving redundant positions to operational roles. 	Con <ul style="list-style-type: none"> Potential loss of individual departmental identity. Difficulty in merging payroll and other human resources systems. 	
Fiscal Considerations: <ul style="list-style-type: none"> Could result in lower personnel costs by removing redundant positions. May require new personnel management IT systems. 		

Shared Health and Safety Programs

The health and safety of firefighters is critical. Establishing a shared approach to addressing these needs within New Hanover County and the City of Wilmington can be beneficial to both organizations.

Develop a Regional Health and Safety Program		Timeline: Short term
Objective: Provide a consistent and cooperative fire-service related health and safety program		
Summary Background: A single method and source for providing occupational and health services may provide savings through economies of scale and reduced worker's compensation costs. <i>NFPA 1500, Standard on Fire Department Occupational Safety and Health Programs</i> , provides the minimum requirements for a fire-service related occupational safety and health program. Each department already provides NFPA compliant medical examinations to pre-hire and existing personnel. Combining these programs will be a benefit to both organizations. Interrelating programs that share functions include wellness, infectious disease, FIT testing, EMS, and hazardous materials.		
Policy Action: Meet with representatives of both organizations to develop a jointly administered safety program. Determine required and desired specifications for an occupational safety and health program. Create a single personnel policy for occupational safety and health.		
Pro	Con	
<ul style="list-style-type: none"> Improves health and safety of all personnel across the region. Ensures that all personnel are receiving the same health benefits. Can potentially identify high risk personnel and allow for pre-treatment of serious conditions. 	<ul style="list-style-type: none"> Could increase costs to one department or the other based on existing health and wellness programs. 	
Fiscal Considerations:		
<ul style="list-style-type: none"> Occupational medicine programs are often menu driven. Items selected for inclusion in the program determine the final cost. Additional financial factors involve whether the fire departments elect to exceed mandated requirements, perform some of the occupational medicine functions internally, or consolidate the occupational medicine program with interrelated programs. 		

Apparatus and Equipment Purchasing

Entering into a joint apparatus and equipment purchasing program will often result in significant cost savings and/or future cost avoidance. Aside from stations, the most expensive piece of equipment fire department use is apparatus. Programs exist that will allow the organizations to jointly specify the types of apparatus to use and work with manufactures to ensure that the lowest cost possible is achieved by purchasing from a single set of specifications. This also includes other equipment such as turnout gear, self-contained breathing apparatus (SCBA), other protective equipment, and supplies.

Joint Purchasing of Equipment and Apparatus		Timeline: Long term
Objective: Create a single set of emergency apparatus and equipment specifications and provide for single-source uniform emergency apparatus and equipment for both agencies.		
Summary Background: The study departments use and maintain a variety of emergency apparatus types and equipment such as self-contained breathing apparatus (SCBA), personal protective equipment (turnout gear, helmets, gloves, etc.), and all sorts of small and large tools and ancillary equipment. Among the common types of apparatus and equipment each department uses different makes, models, and configurations. A standard specification and procurement process for each apparatus and equipment type would result in lower cost, faster production, training efficiencies, and safer and more efficient scene operations. A joint purchasing program can also lead to a long-term program of sharing equipment across the region to enhance overall capabilities. This could include a joint capital replacement plan that encompasses all heavy rolling stock within the region, funded by individual partners.		
Policy Action: Use provided data on current multi-agency fleet to generate a comprehensive apparatus replacement schedule including agreed upon replacement interval and projected life expectancy of all equipment. Examine the potential of refurbishment, rehabilitation, or remounting of apparatus if feasible and evaluate technological updates necessary in small tools and safety equipment. Develop and follow a prescribed load list for apparatus standard equipment as well as consistent location of tools and equipment on all apparatus.		
Pro	Con	
<ul style="list-style-type: none"> • The cost savings of purchasing a stock unit is often 20 percent or more when compared to a custom unit. • Consistency in equipment and compartments on apparatus can increase on scene efficiency and effectiveness. • Ease of training personnel from multiple agencies on use and operation of apparatus and equipment. • Apparatus can be painted in accordance with current department models without losing effectiveness of consistency in construction and operation. 	<ul style="list-style-type: none"> • Potential loss of customization. • Long process of increasing consistency. • Specialization of apparatus based on community risk will impact certain equipment needs. • Current apparatus life cycles will vary making replacement planning difficult. 	

Joint Purchasing of Equipment and Apparatus	Timeline: Long term
<p>Fiscal Considerations:</p> <ul style="list-style-type: none">• Time and effort savings by preparing fewer bid specifications.• The prospect for conducting fewer bid processes.• Cost savings in acquiring emergency fire apparatus and equipment.• Consider the purchase of stock versus custom apparatus.• Consider leasing versus outright purchase of emergency apparatus.	

Regionalized Training Opportunities

Training of emergency responders is a need that is common to all emergency services organizations. Currently, training is generally conducted independently, offering opportunities to address shared training needs based on a regionalized perspective. Some limited company level training is currently being conducted but not on a formal basis.

Regional Training Program		Timeline: Short term
Objective: Consolidate training programs to provide more options to all personnel to capitalize on the instructor base of each agency.		
Summary Background: The departments currently have separate training programs, which may limit instructional opportunity, duplicate recordkeeping, and foster separation of workgroups. This has been done once before regarding a joint recruit academy. This program should be expanded to include ongoing continuing education for all levels of personnel. Consolidating training programs will allow each agency to work side-by-side with all types and levels of personnel to improve working relationships and foster an environment of cooperation.		
Policy Action: Agencies should expand the current model of joint initial training and develop joint ongoing training program standards and objectives that comply with published standards and effectively address all mandatory training requirements.		
Pro <ul style="list-style-type: none"> • Personnel would have more options to attend training on alternative days/nights. • Interagency training opportunities with consistent instruction should result in enhanced emergency scene cooperation, teamwork, and performance. • Reduced cost and duplication of effort in the planning and development of course materials. • Broader array of topics, apparatus, tasks, and evolutions for the volunteers to experience. • The program could easily expand to include other agencies, further enhancing the training opportunities throughout the region. 		Con <ul style="list-style-type: none"> • Cooperative effort may result in less agency-specific training and flexibility.

Regional Training Program	Timeline: Short term
<p data-bbox="203 237 462 264">Fiscal Considerations:</p> <ul data-bbox="203 273 1414 804" style="list-style-type: none"><li data-bbox="203 273 1414 342">• A reduction in duplicated staff effort (reduces soft costs) and training staff to develop similar but separate programs based on the same or differing standards.<li data-bbox="203 342 1414 375">• A potential for reduced specialized training costs through a larger pool of personnel.<li data-bbox="203 375 1414 445">• The elimination of duplicated staff effort (reduces soft costs) in the selection, development, and updating of separate training manuals.<li data-bbox="203 445 1414 514">• Instructional time is likely impacted during multi-agency training sessions by reducing or eliminating the time devoted to adaptive or remedial training.<li data-bbox="203 514 1414 583">• An emergency workforce trained under a cooperative system is more efficient and effective in reducing property damage and loss during emergency incidents.<li data-bbox="203 583 1414 653">• An elimination or reduction in duplicated staff effort (reduced soft costs) in the creation and updating of multiple training plans.<li data-bbox="203 653 1414 722">• Instructional time is increased during multi-agency training sessions with personnel trained to selected certification levels.<li data-bbox="203 722 1414 756">• A reduction in costs through coordination of shared training resources and equipment.<li data-bbox="203 756 1414 804">• Economies of scale in the collective purchase, use, and maintenance of a single RMS.	

Regionalized Fire Prevention and Public Education

Like training, fire prevention and public education needs are similar in the study agencies. As discussed in the Evaluation of Current Conditions section of this report, prevention focus varies considerably between each of the participants. Collaboration in the area of fire prevention and public education offers multiple advantages.

Regional Code Enforcement and Life Safety Education Program		Timeline: Mid term
Objective: Provide for a Uniform Fire Code with a single set of local amendments that apply to new construction, remodels, and tenant improvements as well as providing for cost effective, regional code enforcement activities and life safety education programs.		
Summary Background: The study departments have adopted the state fire code and, with only a few exceptions, each has added local amendments to address issues considered unique to the jurisdiction. Adopting a single fire code would benefit the fire departments, developers, and the citizens of the entire county. One such benefit includes a decrease in the cumulative cost of individually developing local amendments to the fire code.		
Policy Action: <ul style="list-style-type: none"> • Formalize the creation of a coalition through a written agreement. • Involve others from outside the area and from non-traditional groups (insurance industry, educators, NC Office of the State Fire Marshal, media). • Create standardized messages that can be used across the region. • Learn from others. Model the coalition after other successful regional public fire safety education programs. • Some agreements related to current local amendments could be affected by changes or the adoption of new amendments. • Agencies must work closely with all building officials in the adoption of local amendments. • Develop a model citation program for local adoption as part of the local amendments. • Formalize a consistent fee schedule. 		
Pro	<ul style="list-style-type: none"> • Fire codes and enforcement of those codes would be more consistent throughout the region. • Municipalities can share resources to ensure that programs are delivered throughout the region. • Reduced cost by consolidated resources. • Potential for consolidated plans review. 	Con <ul style="list-style-type: none"> • Loss of local control of inspection program. • Potential loss of municipality-specific education programs.
Fiscal Considerations: <ul style="list-style-type: none"> • The elimination of duplicated staff effort in the creation and distribution of public fire safety education messages reduces soft costs. • Cost savings can be achieved through group purchasing of materials and other media. • Departments currently without a presence in public education efforts would see a cost increase. • Marginal costs of creating a single fire code should compare favorably against the reduced level of effort required individually by the agencies. 		

Regional Apparatus and Equipment Maintenance Program

Currently, each organization maintains their own independent equipment and apparatus maintenance program with NHCFR taking apparatus out of service for extended periods to transport them to a regional apparatus repair center in Fayetteville. Coordination and utilization of the WFD maintenance resources could reduce downtime of critical apparatus and improve overall quality and consistency of maintenance and repair programs.

Regional Apparatus and Equipment Maintenance Program		Timeline: Mid term
Objective: Provide for a single point of apparatus and equipment maintenance and repair to reduce downtime of critical equipment, reduce costs of maintenance programs, and improve overall maintenance of apparatus and equipment.		
Summary Background: Although, at one time, WFD completed some maintenance work for the county, the departments currently have very different maintenance programs. WFD has an internal maintenance facility that is tasked with the periodic maintenance and repair of all fire department equipment, up to a certain level. NHCFR depends on a regional apparatus repair center, located in Fayetteville, for most apparatus issues. With the coordination and cooperation of apparatus and equipment maintenance and repair, there is certain to be efficiencies gained by reducing downtime and increasing the consistency of all maintenance and repair programs.		
Policy Action: <ul style="list-style-type: none"> • Use information provided to identify differences in apparatus and equipment currently in use within each organization. • Identify the capacity of the WFD maintenance program. • Work closely to determine if it is feasible to bring NHCFR into the WFD maintenance program. • Formalize an agreement with remuneration of all equipment and apparatus repair and maintenance. 		
Pro <ul style="list-style-type: none"> • Reduced downtime of critical apparatus and equipment. • Increased efficiency in repair and maintenance scheduling. • Increased consistency in maintenance programs. • Closer coordination and availability of repair and maintenance resources. 	Con <ul style="list-style-type: none"> • Potential lack of capacity within the current WFD maintenance facility. • Due to differences in current fleet and equipment, initial difficulties in obtaining appropriate parts, manuals, and training for specific items. 	
Fiscal Considerations: <ul style="list-style-type: none"> • The elimination of duplicated staff effort in the creation of a joint maintenance program. • Reduced staff time and equipment downtime with local facility. • Cost savings can be achieved through group purchasing of materials and parts. • Contract for service will be necessary to ensure adequate funding for additional workload within WFD facility. 		

Operational Consolidation

This strategy joins two or more entities, in their entirety, through the execution of an intergovernmental agreement (IGA). The resulting organization features a single organizational structure and chain of command. Depending on the form of the agreement(s) establishing the organization, members may remain with the original agency, transfer to one of the other agencies, or transfer to an entirely new organization.

Unlike functional consolidation, an operational consolidation brings the actual operations of the separate organizations together into a single department that provides services to one or more communities but does not create a new legal entity. The organizational structure, command, and operational model will depend upon the structure and format of the agreements established between the agencies. Like functional consolidations, operational consolidations are sometimes considered an intermediate step leading to a full merger. The main advantage of the strategy offers governing bodies the ability to negotiate and monitor desirable outcomes for the management of a particular service. This gives a higher level of comfort in going forward with the decision to unify fire service across a geographical region.

In North Carolina this type of shared services is governed by Chapter 160A, Article 20 NCGS, which states,

Any unit of local government in this State and any one or more other units of local government in this State or any other state (to the extent permitted by the laws of the other state) may enter into contracts or agreements with each other in order to execute any undertaking. The contracts and agreements shall be of reasonable duration, as determined by the participating units, and shall be ratified by resolution of the governing board of each unit spread upon its minutes.⁸

Article 20 provides guidance regarding what is allowable within joint agencies, personnel, requirements of the written agreement, revenue, and expenditure rules. The following paragraphs review potential operational consolidation efforts that ESCI believe to be feasible for the study agencies.

Status Quo

Any discussion of potential feasible operational consolidation options would be remiss if it did not consider continuation of the current model. In this study area, the current model of providing services independently, while not at optimal efficiency, is a viable option for future service delivery.

The current relationships between the fire departments in New Hanover County and the City of Wilmington have evolved to where they are today and the result has been positive. The current model is a feasible option moving forward and should not be discounted. Service delivery and performance falls within acceptable limits and major problems are not found in the study area overall. However, the question is whether it can be done even better – the subject of the following analysis.

⁸ NCGS §160A-461.

Operationally Consolidated Fire and Emergency Services Delivery

As discussed previously, the governance of a combined organization can take on several forms and in an operational consolidation, typically organizations come together to form a single service provider while maintaining independent control of funding.

The term ‘Fire District’ in North Carolina can take on more than one meaning. For the purposes of this discussion, the term Joint Powers Agreement (JPA) is more appropriate in terms of governance. A Fire District *per se*, will be discussed in the next section.

Joint Powers Agreements (JPAs) are not uncommon in North Carolina and can serve as a valuable tool. State statutes authorize two or more governmental entities to collaborate in exercising any power common to the jurisdictions and to provide a joint board representing the participating entities and overseeing administrative and management matters.

The advantage of a JPA in this instance is that each entity maintains autonomy regarding taxation and each retains the ability to withdraw from the agreement in the future, given proper notice. As is currently the practice in the study area, each participating entity would levy a tax in its own way (NHCFR through the special district and WFD through the general fund) and then contribute to the operations of the JPA as outlined in the enabling documents. No legislative approval is required for this type of agreement and the intergovernmental agreements created would define how the JPA was governed as well as how each participant is represented.

While the fact that each entity maintains its autonomy can be considered advantageous, it may also be viewed as a drawback. Remaining as separate entities under a JPA, so that a participant can withdraw, lacks a long-term dedicated commitment to the JPA, making future planning and visioning more challenging.

In most situations where two or more governmental organizations enter into a shared services agreement through a JPA, the governing board consists of representatives from the participating agencies. Under the assumption that at least one representative from each participating jurisdiction serve on the board of a newly created JPA, in this study area, the board would consist of five members, each with an equal vote. Given the fact that previous efforts at combining resources and/or capabilities between the city and the county have been contentious, it is ESCI’s recommendation that two members from each entity be appointed to the governing body and fifth member be appointed from one of the beach communities as an uninvolved neutral party.

Many governing bodies find it difficult to reach consensus on a majority of issues when the membership of the board surpasses five to seven members. This is not to say that larger boards cannot be productive but rather to urge that smaller boards are more efficient at dealing with public safety issues. In the case of the study region, ESCI recommends a board of no more than seven individuals with representation based on a similar weighting as mentioned above.

Prior to discussing alternative assessments, fees, or other increases to the current revenue stream, the governing boards of the participating agencies should clearly define the level of community emergency

service in measurable terms. For example, the boards should specify the service (fire protection), the quantity (a fire engine and three firefighters), the quality (within six minutes of dispatch), and the accuracy (80 percent of the time). Once service is defined in specific and measurable terms, the tasks of determining cost and the consideration of funding alternatives become more focused.

Potential funding alternatives can be grouped into two general categories: untapped revenues and redirected funds. Untapped revenue is represented by existing funding alternatives that are not fully used, like a tax increase or the implementation of a new tax, and by the identification of fees that do not fully recoup service costs. Redirected funds are existing revenue identified as non-contributing toward the essential goals of the organization and, therefore, may be more efficiently allocated to other programs or functions.

There are essentially three methods that can be used to redirect public funding: 1) proving that money could be spent more effectively, 2) showing that a population or area is not receiving its fair share of service, and 3) changing a policy so that a program can access a funding stream that currently exists.⁹ In order to redirect funding, leadership researches what funding is available, who controls the funding, what the policies are, and whether or not allocation patterns can be changed.

For this study area, this would involve altering the methodology for calculating the cost of serving the region. A formula for apportioning service cost may factor in assessed valuation, population (residents and employees), service demand, level of service, and area size. One option for leveling cost fluctuations is to employ a formula using multiple factors (population and assessed valuation, for instance).

What follows is an alphabetical listing of system variables that can be used (singularly or in combination) to allocate cost between allied fire departments. Each option is summarized by the concept, its advantages and disadvantages, and other factors that should be considered. Regardless of the option(s) chosen to share the cost of fire protection, the resulting intergovernmental agreement needs to address the issues of full cost versus marginal cost and should be clear about the inclusion of administrative or overhead costs. In addition, service contracts often must reconcile the exchange of in-kind services between the participating agencies, if any.

⁹ *Sustainable Funding for Program Strategies: Lessons Learned from an Ambitious Community Change Effort*. Urban Health Initiative: Seattle, WA, June 2005.

Area

Concept:

The cost of emergency service can be apportioned based on the geographic area served relative to the whole. For instance, the jurisdictional boundaries of the region represent approximately 185.75 square miles, not including the beach communities. Allocation based on area would apportion about 28.53 percent of cost to the City of Wilmington (53.00 square miles) and 71.47 percent to New Hanover County (132.75 square miles). Apportionment founded on service area alone may work best in areas that are geographically and developmentally similar.

Pro:

Service area is easily calculable from a variety of sources.

Con:

Service area does not necessarily equate to greater risk or to greater workload.

Consider:

Service area may be combined with other variables (assessed value and number of emergencies) to express a compound variable (such as assessed value per square mile and emergencies per square mile).

Assessed Value

Concept:

The assessed value of an area is established by the local tax assessor under laws of the state. Usually, higher-valued structures and complexes carry a greater risk to the community from loss by fire; consequently, assessed value also tends to approximate the property at risk within an area. Fire departments are charged with being sufficiently prepared to prevent property loss by fire. Therefore, the cost of contracted fire protection may be apportioned relative to the assessed value of the allied jurisdictions. Typically, assessed value is used to apportion cost of shared service by applying the percentage of each partner's tax capacity to the whole.

Calculation of applying assessed value to the study area results in the following: The City of Wilmington would pay about 53.25 percent (\$13.1 billion) and New Hanover County would pay approximately 46.75 percent (\$11.5 billion). It should be understood, however, that the current method for funding fire protection in unincorporated New Hanover County is by levying a special fire tax. Within the city, the general fund levy supports the entire city general fund budget including the fire department. Additionally, the total valuation of the county includes the valuation within the city since it is also considered part of New Hanover County. The county valuation also includes the beach communities that would not receive fire protection from a cooperative model.

Pro:

Assessed value is updated regularly helping to assure that adjustments for changes relative to new construction, annexation, and inflation are included. Because a third party (the assessor) establishes

tax capacity in accordance with state law, it is generally viewed as an impartial and fair measurement for cost apportionment. Fire protection is typically considered a *property-related service* and, thus, apportionment tied directly to property value has merit.

Con:

Assessed may not reflect the risk associated with certain exempt property, such as schools, hospitals, universities, government facilities, churches, and other institutions. Assessed value may also not always represent the life risk of certain properties, such as nursing homes or places of assembly, which might dictate more significant use of resources. In addition, some large facilities may seek economic development incentives through assessment exemptions or reductions. Adjustments may need to be made to assessed value if such large tracts of exempt property in one jurisdiction cause an imbalance in the calculation. Finally, assessed value typically includes the value of land, which is not usually at risk of loss by fire. Depending on the local circumstance, however, this may not be a significant factor if the relative proportion of land value to structure value is reasonably uniform over the whole of the territory.

Consider:

Some states discount assessed value depending on the class of property (commercial or residential), which may skew the overall proportion of those properties compared to risk. As an additional consideration, county assessors usually establish the assessed value in accordance with the property tax cycle, which can lag somewhat behind the budget cycle of local agencies and the time when service contracts are reviewed or negotiated.

Service Demand

Concept:

Service demand may be used as an expression of the workload of a fire department or geographical area. Cost allocation based on responses would consider the total response of the service area and apportion system cost relative to the percentage of emergencies occurring in the jurisdictions. Under a system apportioned by service demand, the City of Wilmington would pay 67.41 percent and New Hanover County would pay 32.59 percent. The application of this concept could also include an average of total service demand, perhaps over a three or five year period.

Pro:

Easily expressed and understood. Changes in the workload over the long term tend to mirror the amount of human activity (such as commerce, transportation, and recreation) in the corresponding area, which translates to service demand.

Con:

Emergency response fluctuates from year to year depending on environmental and other factors not directly related to risk, which can cause dependent allocation to fluctuate as well. Further, the number of alarms may not be representative of actual workload; for example, one large emergency event requiring many emergency workers and lasting many hours or days versus another response

lasting only minutes and resulting in no actual work. Finally, emergency response is open to manipulation (intentional and/or unintentional) by selectively downgrading minor responses, by responding off the air, or by the use of mutual aid.

Consider:

Using a rolling average of incidents over several years can help to suppress the normal tendency for the year-to-year fluctuation of emergencies. Combining the number of responses with the number of response units and/or personnel required may help to align responses with actual workload more closely; however, doing so adds to the complexity of documentation. In a similar manner (and if accurate documentation is maintained), the agencies could consider using the total time required on emergencies as an aid to establish the comparative workload represented by each jurisdictional area.

Population

Concept:

Payment for service can be based on the proportion of residential population to a given service area. The most recently available census population of the service area (2012 U.S. Census estimates) totals 198,754; the City of Wilmington at 109,922 and New Hanover County at 88,832. Apportionment based on the estimated population of the service area would allocate about 55.31 percent of cost to the City of Wilmington and 44.69 percent to New Hanover County.

Pro:

Residential population is frequently used by governmental agencies to measure and evaluate programs. The U.S. Bureau of Census maintains an easily accessible database of the population and demographics of cities, counties, and states. Estimates of population are updated regularly. Laypersons intuitively equate residential population to the workload of fire departments.

Con:

The accurate population of partially covered areas is often difficult to establish. Census tract boundaries and response area boundaries infrequently match, forcing extrapolated estimates, which can fail to take into account pockets of concentrated population inside or outside of the response areas. Further, residential population does not include the daily and seasonal movement of a transient population caused by commerce, industry, transport, and recreation. Depending on the local situation, the transients coming in (or going out) of an area can be very significant, which can tend to skew community risk. Residential population does not statistically link with emergency workload; rather, human activities tend to be the linchpin that connects people to requests for emergency assistance.

For example, if residential population actually determined emergency workload, emergencies would peak when population was highest within a geographic area. However, in many communities where the residential population is highest from about midnight to about 6:00 a.m. (bedroom communities), that time is exactly when the demand for emergency response is lowest. It turns out

that emergency demand is highest when people are involved in the activities of daily life — traveling, working, shopping, and recreating. Often, the persons involved in such activities do not reside in the same area.

Consider:

The residential population of partially covered areas can sometimes be estimated by using the GIS mapping capability now maintained by most cities and counties. By counting the residential households within the area in question, then applying demographic estimates of persons per household, it may be possible to reach a relatively accurate estimate of population within the area in question. Alternately, residential population can be estimated by using information obtainable from some public utility districts by tallying residential electrical meters within a geographic area and then multiplying by the persons per household.

Some areas experience a daily or seasonal influx of people who are not counted as residential population. This transient population can be estimated by referring to traffic counts, jobs data, hotel/motel occupancy rates, and, in some cases, state or national park administrators. Residential population plus transient population is referred to as *functional population*. Where functional population is significantly different from residential population, service agreements based on population should be adjusted to account for it.

Allocation Summary

The information provided above serves as a detail of each funding alternative presented. Given the lengthy discussion provided with each alternative, ESCI has compiled the information into a summary table illustrating how each funding alternative would be distributed among the member communities.

Figure 70: Cost Allocation Summary

Jurisdiction	Area	Assessed Value	Service Demand	Population	Composite
New Hanover County	71.5%	46.8%	32.6%	44.7%	57.2%
City of Wilmington	28.5%	53.3%	67.4%	55.3%	42.8%
	100.0%	100.0%	100.0%	100.0%	100.0%

Rather than using individual variables for area, assessed, value, service demand, or population, ESCI also averaged the various elements into a composite shown above.

Multiple-Variable Allocation

Frequently, even though everyone may agree on the benefit of allied fire protection, officials find it difficult to reach an agreement with regard to costs and the allocation of those costs. The differences between community demographics and/or development, along with changes that occur within the system over the long term, can cause the perception of winners and losers. This can be especially prevalent when a single variable is used to apportion cost. A service contract based on more than one allocation determinate may help solve these problems.

By apportioning costs over multiple variables, members of an alliance may be able to reach a long-term agreement that fits the diversity of the partnering agencies. The following figure represents random weights assigned to each element. Final weights should be determined by the partners as part of the contract.

Figure 71: Multiple Variable Weights

Multiple Variable #1	
Area	15%
Valuation	25%
Service Demand	25%
Population	35%
	100%
Multiple Variable #2	
Area	25%
Valuation	20%
Service Demand	40%
Population	15%
	100%
Multiple Variable #3	
Area	10%
Valuation	35%
Service Demand	30%
Population	25%
	100%

Based on the random weights as noted above, the allocation of cost would be distributed as follows.

Figure 72: Multivariable Weighted Allocation

Jurisdiction	Multiple Variable #1	Multiple Variable #2	Multiple Variable #3
New Hanover County	49.9%	48.5%	47.1%
City of Wilmington	50.1%	51.5%	52.9%
	100.0%	100.0%	100.0%

Legal Unification

Under certain circumstances in law, fire departments can join into a single entity. This formal approach unites not only the programs but also the organizations themselves. State laws addressing political subdivisions usually detail a process for legal unification.

Typically, state laws draw a distinction between words like *annexation*, *merger*, and *consolidation* when speaking of legal unification. Organizationally, however, the outcome of any such legal process results in one unified organization. The primary differences between the legal strategies relate to governance and taxation issues. In many states, some process of *inclusion* exists that essentially involves the annexation of one entity into another, preserving the governing body and taxing authority of the surviving agency. A

legal merger, on the other hand, usually entails the complete dissolution of two or more agencies with the concurrent formation of a single new entity (and governing body) in place of the former.

Section 153A-233 of the NCGS authorizes a county to establish and maintain a county fire department. Given the costs of doing so, most counties do not opt for this model but rather contract with one or more entities. New Hanover County is one of only a few county fire departments in North Carolina. As such, the county established a special service district to fund the fire services in the unincorporated areas of New Hanover County. Since the consolidation of all fire protection services in unincorporated New Hanover County, the county has operational control over all aspects of those services outside the City of Wilmington and the beach communities.

Under state law, a county service district (like the existing fire service district) cannot include territory lying within the corporate limits of a city unless the governing body of the city agrees by resolution to include. In other words, if the city were to move forward with the county as a unified county fire department, the city would adopt a resolution effectively relinquishing its control of fire protection to the county. Conversely, the county could govern the special district and fund with a single tax applied to all property within the district (including the city) and then contract with the city to provide services to the entire service district.

The ideal or optimum model for governance in a legal unification is an independent taxing district that serves as a quasi-governmental entity, is governed by elected representatives from the community or communities served, and have the authority to levy taxes as set by the governing board. Statutory allowances to accommodate various forms of merger and consolidation are limited in North Carolina law and to achieve some forms of unification, legislative action may be necessary to provide the authority to do so. Currently, independent fire districts are not address within the general statutes.

Because ESCI often finds that study agencies are reluctant to relinquish control of their respective fire departments to a full consolidation, the intent of this project is to evaluate potential opportunities and to provide information to policymakers with which they can make informed and successful decisions regarding the future of fire protection and emergency services within their respective communities.

Fiscal Analysis

ESCI projects the financial result of any proposed consolidation. The forecast does not attempt to predict the finances of the departments because changes in law and politics are certain to make such forecasting inaccurate. Rather, ESCI's analysis shows how trends in the cost of labor and other operational expenditures act on the outcome of a consolidation based on 2013 policy and law. The following figure details the combined baseline budget of the departments using 2013 expenditures as the base from which to build future budget models.

Figure 73: Baseline Budget Comparison - 2013

	NHCFR	WFD	Total
Personnel	\$6,976,184	\$13,769,386	\$20,745,570
Operating	\$3,035,345	\$1,895,208	\$4,930,553
Capital	\$1,464,934	\$55,583	\$1,520,517
Total	\$11,476,463	\$15,720,177	\$27,196,640

Based on the combined departmental budgets for 2013, a total of \$27,196,640 was budgeted for fire protection within the City of Wilmington and unincorporated New Hanover County. This equates to \$136.84 per capita compared to the North Carolina average of \$90.89 and the national average of \$135.60.

In order to build estimates of what a future consolidated department may cost, ESCI first had to make certain assumptions.

8. The operational service delivery model would remain constant.
9. The service delivery performance objectives would remain constant or be improved.
10. Administrative and support services would be consolidated into a single facility (some code enforcement functions are already co-located at the New Hanover County government center).
11. The organization would only require one fire chief.
12. All administrative and support position titles would be merged (to be determined by the governing body of the organization prior to implementation).
13. Operational ranks and titles would be merged (to be determined by the governing body of the organization prior to implementation).
14. Methods of funding will be determined by the governing bodies and the final governance model chosen.

To build a base from which to estimate future costs, ESCI developed a sample staffing strategy that the project team feels accomplishes the goals of the consolidated organization and maintains critical functions while improving efficiency and reducing cost. The following figure illustrates that example but should **NOT** be considered as the final structure of the consolidation organization. This sample is for base estimating purposes only.

Figure 74: Example Administrative and Support Complement

Position	NHCFR	WFD	Proposed	Description
Fire Chief	1	1	1	
Deputy Chief	0	2	2	Operations, Administration and Support
Assistant/Division Chief	3	0	4	Safety, Fire & Life Safety, Training, Logistics
Battalion Chief	1	5	0	
Inspector (All Ranks)	3	5	8	
Training Officer (All Ranks)	2	4	6	
Firefighter	0	4	0	
Educator	.5	1.5	2	
Garage Supervisor	0	1	1	
Mechanic	0	2	3	
Hydrant Tech.	1.5	0	2	
Logistics Staff	1	1	2	
Analyst	1	2	2	
Clerical	2	4.5	6	
Total	16	33	39	

The consolidated system would have a single fire chief to oversee the department, two deputy chiefs dedicated to operations and administration, four assistant/division chiefs overseeing safety, fire and life safety programs, training, and logistics. Eight inspectors including both current captain and firefighter ranks, six training officers that would work under the assistant/division chief of training, and two educators would work under the deputy chief of fire and life safety and be responsible for public education activities. A maintenance supervisor would oversee three mechanics responsible for all departmental fleet and equipment repairs and periodic maintenance. Two logistics staff would report to the assistant/division chief of logistics and work to ensure that each station is supplied as necessary. Two data analysts will continually work to ensure that accurate data is available to the department for quality assurance and improvement purposes and six clerical staff will support each of the division heads and the fire chief.

It should be understood that some, or all, of the potential savings from the creation of a single organization would come through attrition rather than being realized immediately. From an operational perspective, the future deployment model reallocates some resources based on a consolidated system as outlined in the following figure.

Figure 75: Example Apparatus Deployment and Minimum Staffing

	Engine	Truck	Rescue	Command	Safety	Total Staffing – per Shift	Total Staffing
Station 1	2	1		1		13	39
Station 2	1		1			8	24
Station 3	1					4	12
Station 4	1			1		5	15
Station 5	1	1				8	24
Station 6	1					4	12
Station 7	1	1				8	24
Station 8	1	1			1	9	27
Station 9	1					4	12
Station 10	1			1		5	15
Station 11	1					4	12
Station 12	1					4	12
Station 13	1					4	12
Station 14	1					4	12
Station 15	1					4	12
Station 16	1					4	12
Station 17	1	1		1		9	27
Station 18	1	1				8	24
Station 19	1					4	12
Total Apparatus	20	6	1	3	1	113	339

Based on the example apparatus deployment above, the second engine at Station 1 is moved to become a truck at Station 18. Also, given the assumed erasure of district boundaries, the geographic area and the community risk, only one rescue would be deployed centrally and all ladder companies would be equipped with rescue equipment. Deployment of personnel across the ranks would follow the example below.

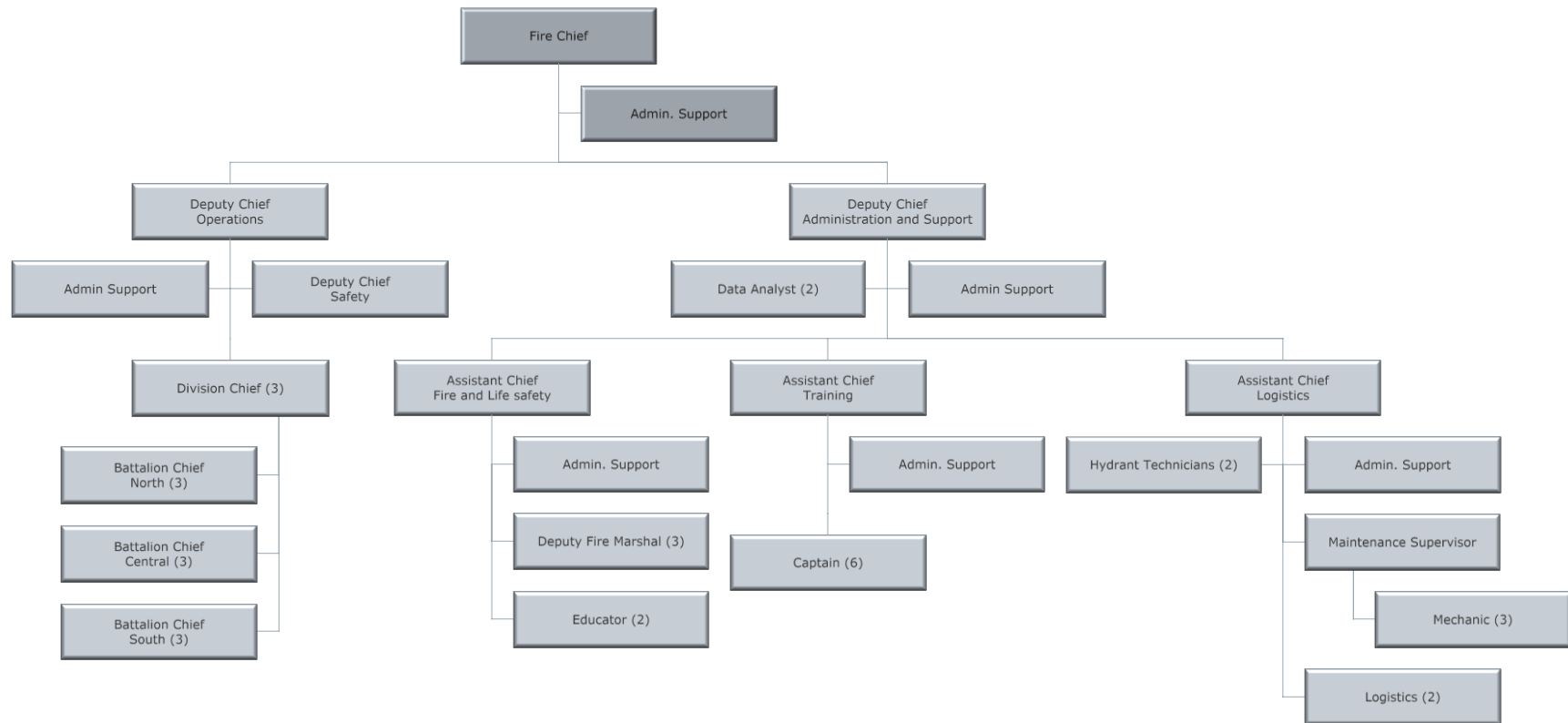
Figure 76: Example Operational Complement

Position	NHCFR	WFD	Total	Proposed
Division Chief	0	0	0	3
Battalion Chief	3	6	9	9
Captain/Lieutenant	27	48	75	81
Apparatus Operator/Engineer	49	0	49	81
Master Firefighter	0	45	45	0
Safety	0	3	3	3
Firefighter	18	90	108	162
Total	97	192	289	339

The example staff distribution by rank also redeploys several positions as was done with apparatus. One division chief will be assigned to each shift to serve as the overall organization command officer 24-hours/day and three battalion chiefs will be assigned to each shift (north, central, and south). Each engine company is assigned one captain, one engineer/apparatus operator and two firefighters. This is a departure from current staffing practices where, in some cases, only three personnel are assigned to an engine. This increase in staffing is in line with WFD's recently approved reconfiguration of resources and will make all units consistent throughout the overall response area. All truck and rescue companies are staffed with four personnel comprised of a lieutenant, engineer/apparatus operator, and two firefighters.

The example personnel distribution is based on filled positions and does not consider benefit leave or other vacancies. In order to generate an FTE estimate, ESCI uses a factor of 1.2 to estimate the total number of personnel necessary to maintain staffing levels and accommodate benefit leave and absences. Considering this factor, the total FTE requirement is estimated at 393 operational personnel. This represents an overall increase in total personnel FTEs of 48. This does not take into account the proposed reduction in administrative and support personnel by 10 positions. This would translate into an overall increase in personnel expenditures but the improvement in service delivery should outweigh that cost. The following figure is a proposed organizational chart for the combined organization.

Figure 77: Example Consolidated Organizational Chart



Implementation Plan

The remainder of this report describes a standard recommended process for moving forward with the potential implementation of a cooperative service delivery effort. The word *potential* is used here because a part of this process includes the policy decisions necessary to determine, based on the results of this study, whether there is sufficient desire among the political bodies of the organizations to continue with the process or not. The implementation begins with that step.

CONDUCT VISION SESSION(S) WITH POLICY-MAKERS

The initial stage of implementation begins with the most elementary decision: “Do we want to move forward or not?” It is extremely important that at this stage of the process it is clearly recognized that this is a public policy decision on the part of the governing entities involved. A decision to consider altering the way in which a critical public safety service is provided, in some cases even permanently altering the governance of those services, is clearly in the purview of the elected bodies. While senior management input should be considered, the final decision should not rest at any level lower in the organization than those who are elected to represent the customers.

For this reason, it is recommended that the elected bodies meet together for the initial discussion of the feasibility study and its projected options and outcomes. Depending on the number of elected officials, the policy-makers can decide whether to include all elected officials or a representative group assigned to represent each governing entity. During this policy stage, involvement by additional staff should be kept to a minimum, perhaps at the senior management level and then for the sole purpose of providing technical support. It is important to limit the ability for the process to be “hijacked” at this point by strenuous arguments for or against the idea from operations-level personnel whose opinions may be influenced by turf, power, or control issues. Stakeholder input is important, but opportunity can be provided for this once the policy-makers have determined what is in the best interest of their citizens as a matter of public policy.

It is equally important that the policy-makers recognize exactly what decision is under consideration in the initial vision meetings. The purpose is to weigh the strategies, operational advantages, fiscal outcomes, and potential impediments of the feasibility to determine whether to commit local resources, and move the process forward. The decision is not, at this point, a final decision to execute a determined strategy. The final commitment to take legal actions necessary to finalize implementation of any given strategy will come much further into the process.

This initial vision meeting can be likened to the court process known as a probable cause hearing. The purpose of such a hearing is for a judge or grand jury to determine if sufficient evidence exists to warrant an arrest and a trial. The probable cause hearing does not determine the final verdict or sentence. That occurs after the much more thorough process and deliberation of the trial. Likewise, the vision meetings are for the policy-makers to judge whether sufficient evidence exists to warrant moving forward. The final verdict on whether to take legal or contractual actions to implement will come after weeks, months, or even years of additional detailed planning work involving stakeholders, operations staff, legal counsel, finance personnel, and others. As this actual implementation planning work moves

forward, there may be several points at which new information or undefeatable obstacles arise that cause one community or the other to decide not to finalize and implement the plan.

The term “vision session” is used here because the policy-makers will be determining their joint decision on a future vision toward which the additional work of implementation will be directed. In many cases, several legal, operational, or functional strategies are presented as being feasible in the study. These may involve various options for governance, finance, and organizational structure. Which one or ones should the entities pursue, if any? This will become the joint vision of the policy-makers.

One of the best methods for initiating this vision process is to begin with policy-makers sharing an open discussion of critical issues. Each entity’s representative can present a short description of those critical issues, service gaps, or service redundancies that might be concerning them relative to their provision of public safety services. As each entity takes its turn presenting these issues, a picture typically emerges of those shared critical issues that two or more of the entities have in common. This focuses the discussion on which of the feasible options from the study best address those critical common issues and how.

As the discussion focuses on those feasible options with the greatest opportunity to positively impact shared critical issues, the discussion can expand to the strengths and weakness of the strategies relative to the conditions, financial abilities, and cultural attitudes of the communities involved. There should be a concerted effort to remain at a policy level without becoming overly embroiled in operational discussions of implementation details. Those will be addressed once a common vision has been established for a future strategy that is in the best interest of all the communities involved.

This is also the time that communities may make the decision to opt out of further involvement. This may occur for a number of reasons. There may be legitimate concern that an individual community does not truly share an adequate number of common critical issues with the other communities. There may also be a legitimate concern that the feasible strategies do not do enough to benefit a given community and would leave it with too many remaining critical issues. And, of course, there is always the possibility that a given community will not feel that the projected financial outcome is within their ability or provides a cost-benefit that is better than their current situation. Any such decisions by one or more communities should not be considered a discouraging factor, for that is the very purpose of the vision sessions. In many cases, other remaining entities continue moving forward with a shared vision for cooperative service delivery even after one or more communities determine not to.

The goal of the vision session(s) is to develop a decision by the policy-makers on whether to continue with the next steps and, if so, what direction those steps should take. The vision should be sufficiently decisive as to be actionable by senior appointed officials and staff. While there will be many details to work out in the implementation process, the vision should clearly articulate the intention of the agreeing policy bodies on the desired outcome from the specified cooperative service strategy or strategies. Once this occurs, the real work begins.

After setting the joint vision, this policy-maker group should meet together at set intervals or as needed to hear the progress of the Joint Implementation Committee and its working groups and refine direction

when necessary. The appropriate interval will depend on the situation and the complexity and length of the process itself, but often a quarterly meeting is sufficient.

ESTABLISH A JOINT IMPLEMENTATION COMMITTEE

The next step in the process is to establish a Joint Implementation Committee that will be given the overall responsibility with leadership and management of the planning and implementation process. This will be the “nuts and bolts” group that works through the details, overcomes the challenges, reacts to new information, and makes many of the actual decisions on the implementation plan. This group should have much wider representation from stakeholders both inside and outside of the individual organizations involved. Membership in the Joint Implementation Committee may include senior management personnel and, where appropriate, labor representatives. The following is an example of a Joint Implementation Committee:

- City manager and county manager (or equivalent)
- Fire chief from each community
- Finance director from each community
- Community representative from each community (Chamber of Commerce or similar)

The Joint Implementation Committee should select a chair or co-chairs to function as organizers and facilitators for the committee meetings. In addition, their first order of business should be to determine the rules and procedures of this committee. This should include such items as:

- How often does this group meet? (Monthly is typical.)
- How are absences handled? (Assigned alternates are recommended.)
- How does communication (occasionally secure) within this committee take place?
- How will meetings be conducted? Are there “rules of conduct” for the meetings?
- Under what circumstances will the meetings be opened to attendance by non-members?
- How will the group pursue consensus? When voting is necessary and how will that occur?

DEVELOP AN IMPLEMENTATION STRATEGIC PLAN

Once the ground rules have been set, the Joint Implementation Committee should schedule a strategic planning process. Consideration should be given to having this strategic planning process directed by neutral outside professionals trained in strategic planning facilitation. The strategic planning process should be held in a neutral setting away from the daily activities and noise of the usual office environment. It need not be an expensive retreat, but it should be organized in a way to focus energy and attention exclusively to the planning process for its duration. The purpose of the initial strategic planning session should be as follows:

- To further articulate and refine the joint vision set by the policy bodies.
- To identify critical issues that will be met as the implementation process unfolds.

- To identify potential impediments to implementation from:
 - Organizational culture
 - Availability of data and information
 - Lack of sufficient staff to carry through implementation processes
 - Outside influences and time demands
- To set the specific goals and objectives of the implementation process and the timelines for accomplishment.
- To establish the necessary implementation working groups.

This process should result in the preparation of an implementation planning document that can be shared with the policy body, stakeholders, and others who will be involved in or affected by the implementation process. The document should provide the joint vision, describe the cooperative service strategy or strategies being pursued, the desired outcome, the goals that must be met in order for implementation to be achieved and the individual objectives, tasks, and timelines for accomplishment. When fully and adequately prepared, this document will serve as the master “road map” for the process and will help guide the next steps of developing working groups and assigning responsibilities.

ESTABLISH IMPLEMENTATION WORKING GROUPS

As part of the implementation strategic planning process, various implementation working groups should be established that will be charged with responsibility for performing the necessary detailed work involved in analyzing, weighing, and deciding on specific processes. Membership for these implementation working groups should be roughly identified as part of that process as well.

The number and titles of the working groups will vary depending on the type and complexity of the strategies being pursued. However, the following list provides some typical working groups used in most consolidation processes and a description of some of their primary assigned functions and responsibilities.

Governance Working Group

This group will be assigned to examine and evaluate various governance options for the cooperative service effort. A recommendation and process steps will be provided back to the Joint Implementation Committee and the policy-maker group. Once approved, this working group is typically assigned the task of shepherding the governance establishment through to completion. The membership of this group typically involves one or more elected officials and senior city/district and agency management.

Finance Working Group

This group will be assigned to review the financial projections contained in the feasibility study and complete any refinements or updating necessary. The group will look at all possible funding mechanisms and will work in partnership with the governance working group to determine impact on local revenue sources and options. Where revenue is to be determined by formula rather than a property tax rate, such as in a contractual cooperative venture, this group will evaluate various formula components and model the outcomes, resulting in recommendations for a final funding methodology and cost

distribution formula. The membership of this group typically involves senior financial managers and staff analysts, and may also include representatives from the agencies' administrative staffs.

Legal Working Group

Working in partnership with the governance working group, this group will identify study all of the legal aspects of the selected strategy and will identify steps to ensure the process meets all legal obligations of process and law. Where necessary, this group will oversee the preparation and presentation of policy actions such as ordinances, joint resolutions, dissolutions, and enabling legislation. The group will also be responsible for working with other elected bodies, such as State Legislatures, when necessary to accomplish establishment of local selected governance. The membership of this group typically involves legal counsel from the various entities involved and may also include senior city/district management staff.

Operations Working Group

This group will be responsible for an extensive amount work and may need to establish multiple sub-groups to accommodate its workload. The group will work out all of the details of necessary operational changes required by the strategy. This involves detailed analysis of assets, processes, procedures, service delivery methods, deployment, and operational staffing. Detailed integration plans, steps, and timelines will be developed. The group will coordinate closely with the support services and logistics working group. The membership of this group typically involves senior agency management, mid-level officers, training staff, and labor representatives. This list often expands with the complexity of the services being provided by the agencies.

Support Services and Logistics Working Group

This group will be responsible for any required blending of capital assets, disposition of surplus, upgrades necessary to accommodate operational changes, and the preparation for ongoing administration and logistics of the cooperative effort. The membership of this group typically involves mid-level agency management, administrative, and support staffs. Where involved, support divisions such as maintenance, fire prevention, and others may also be represented.

Labor Working Group

This group will have the responsibility, where necessary, for blending the workforces involved. This often includes the analysis of differences between shifts schedules, policies, and working conditions. Often, once the future vision is articulated by the policy-makers, representatives are willing to step up and work together as a team to identify challenges presented by differing agreements and offer potential consensus solutions. The membership of this group typically involves representatives from each department, senior agency management and, as needed, legal counsel.

Communications Working Group

Perhaps one of the most important, this group will be charged with developing an internal and external communication policy and procedure to ensure consistent, reliable, and timely distribution of information related to the cooperative effort. The group will develop public information releases to the media and will select one or more spokespersons to represent the communities in their communication

with the public on this particular process. The importance of speaking with a common voice and theme, both internally and externally cannot be overemphasized. Fear of change can be a strong force in motivating a group of people to oppose that which they do not clearly understand. A well informed workforce and public will reduce conflict. The membership of the group typically involves public information officers and senior city or agency management.

MEET, IDENTIFY, CHALLENGE, REFINE, AND OVERCOME

Once the working groups are established, meeting, and completing their various responsibilities and assignments, it will be important to maintain organized communication up and down the chain. The working group chairs should report regularly to the Joint Implementation Committee. When new challenges, issues, impediments, or opportunities are identified by the working groups, this needs to be communicated to the Joint Implementation Committee so that the information can be coordinated with findings and processes of the other working groups. Where necessary, the Joint Implementation Committee and a working group chairperson can meet with the policy-makers to discuss significant issues that may precipitate a refinement of the original joint vision.

The process is continual as the objectives of the strategic plan are accomplished one by one. When sufficient objectives have been met, the Joint Implementation Committee can declare various goals as having been fully met until the point comes when the actual implementation approval needs to be sought from the policy bodies. This formal “flipping of the switch” will mark the point at which implementation ends and integration of the agencies begins.

As an additional guideline, the implementation process has been broken down into a potential timeline for implementation. This is provided only as an example as implementation for any specific agency will be highly variable and depend on a number of factors including willingness of stakeholders to proceed, fiscal resources, timing, etc.

Conclusion

Over the past several years, NHCFR and WFD have enjoyed an increased atmosphere of coordination and cooperation. This includes consistent standard operating guidelines, enhanced mutual and automatic aid response, closest unit response regardless of jurisdiction, etc. Moving in the direction of a more cohesive and consolidated organization is the next logical step. While full consolidation of the organizations into a single entity may be politically or culturally charged, the operations and service delivery to the communities will only improve. Policymakers should take advantage of the current level of cooperation between the two organizations and seriously consider how to better serve the communities as a whole through further cooperative efforts. Any of the identified strategies are considered to be feasible and only political will can determine how far to expand and what strategies to implement. However, it is the opinion of ESCI that bringing these two departments together to form a single entity is in the best interest of both the City of Wilmington and New Hanover County. Efficiencies of scale and an overall improvement in service delivery will be the result, which will directly impact the citizens throughout both communities. Below is a partial list of advantages and disadvantages of a combined organization.

Advantages

- Economies of scale can be realized through the larger organization.
- Service delivery will be improved across the entire county, including the City of Wilmington.
- Future potential to bring in other partners such as the beach communities.
- More consistent and coordinated emergency response.
- Greater efficiency in the administrative and support elements.
- Increased staffing to the unincorporated areas and increased ability to assemble resources quickly.

Disadvantages

- Funding of the combined organization may be difficult to determine at the outset but future strategies could produce a lower cost to the consumer.
- Potential for increased cost up front but the potential for greater efficiencies in the future through attrition.
- Loss of control and/or oversight by one or both of the current government entities.

This should serve as only a partial list but, in ESCI's opinion, the advantages of a combined fire protection and emergency services system that covers all of the unincorporated areas of New Hanover County as well as the City of Wilmington far outweigh the disadvantages. The discussion surrounding this issue has taken place for many years and now is the time to move forward. It should be understood, however, that making the decision to move forward does not bind either organization to consolidation. Moving forward simply means deciding to evaluate the potential further by creating the implementation committee and working groups to evaluate the details of the shared service opportunities. This process should not be rushed nor should any foregone conclusions be assumed. Involvement by all levels of both organizations will be critical in the success of the process.

ESCI began collecting data and information for this project in February 2014 and the review, evaluation, and analysis of that data necessary to complete this document has taken nearly three months. It is the project team's sincere hope that the information contained within this report is found to be useful in allowing policymakers to make an educated decision about the future provision of fire protection and emergency services delivery to their respective communities.